Appendix E: Air Quality, Health Risk and Greenhouse Gas Impact Assessment

(Sespe, updated October 2017)

SESPE
CONSULTING, INC.
374 Poli Street, Suite 200 • Ventura, CA 93001
Office (805) 275-1515 • Fax (805) 667-8104

AIR QUALITY, HEALTH RISK AND GREENHOUSE GAS IMPACT ASSESSMENT

Omya Butterfield and Sentinel Quarries Expansion
San Bernardino National Forest

October 25, 2017

Prepared for: U.S. Forest Service
41374 North Shore Drive
Fawnskin, California 92333

Prepared by: Sespe Consulting, Inc.
374 Poli Street, Suite 200
Ventura, California 93001
(805) 275-1515

SESPE CONSULTING, INC.
374 Poli Street, Suite 200 • Ventura, CA 93001
Office (805) 275-1515 • Fax (805) 667-8104

AIR QUALITY, HEALTH RISK AND GREENHOUSE GAS IMPACT ASSESSMENT

Omya Butterfield and Sentinel Quarries Expansion
San Bernardino National Forest

October 25, 2017

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

SESPE
CONSULTING, INC.
374 Poli Street, Suite 200 • Ventura, CA 93001
Office (805) 275-1515 • Fax (805) 667-8104

AIR QUALITY, HEALTH RISK AND GREENHOUSE GAS IMPACT ASSESSMENT

Omya Butterfield and Sentinel Quarries Expansion
County of San Bernardino, California

October 25, 2017

1.0 INTRODUCTION

This Air Quality, Health Risk and Greenhouse Gas Impact Assessment (AQIA) report has been prepared for the Omya Butterfield and Sentinel Quarries Expansion project ("Project"). The Project is located in the San Bernardino National Forest (SBNF) approximately 7.5 miles south of the intersection of State Route 18 and State Route 247 in the Lucerne Valley. The Project involves the expansion of two quarries and related fill areas which are located on Crystal Creek Road before the intersection with Forest Road 3N16. Primary crushing occurs near the quarries and ore is hauled north down the mountains to the Lucerne Valley Processing Plant (LVPP) located near the intersection of Crystal Creek Road and Powerline Road.

Omya operates one other quarry in the area. The White Knob Quarry is located approximately 4.2 miles west-southwest of the LVPP. Ore from the White Knob Quarry is hauled to the LVPP. White Knob Quarry completed a separate CEQA evaluation for proposed expansions on 8/6/2015 when PC approved the Project and the certified EIR. Cloudy and Claudia Quarries are located near the terminus of Crystal Creek Road south of Forest Road 3N16. Cloudy and Claudia Quarries are inactive and currently being reclaimed.

The combined production from all the operating quarries (Butterfield, Sentinel, and White Knob) is limited by the LVPP maximum production rate. The Project would allow up to the maximum production rate of 680,000 tons per year of finished ore to be extracted exclusively from the Butterfield and Sentinel quarries. This would result in no material being quarried at White Knob which is an indirect effect of the Project that necessitates calculation of White Knob emissions in the air quality baseline. Moreover, vehicular activity data provided by Omya does not distinguish which units operate in each quarry. Thus, the emissions from vehicles are calculated for the fleet and apportioned to quarries based on throughput amount and to units operating on roads by vehicle miles traveled (VMT).

Impacts from alternatives to the Project are assessed in this report and described in 7.2.0. The alternatives include:

- Alternative 1: No Action
- Alternative 2: Proposed Project
- Alternative 3: Partial Implementation – Butterfield Expansion only; and
- Alternative 4: Mixed Production with White Knob.

Alternative 4 represents a scenario where the maximum amount of ore can be quarried from Butterfield and Sentinel without exceeding the tons per year significance thresholds identified in Section 4.0.

2.0 ENVIRONMENTAL SETTING

Air pollutants are regulated in order to protect public health and welfare. Health effects of common air pollutants are presented in Appendix B. Effects of pollutants on public welfare include visibility impairment; and impacts to animals, crops, vegetation, and buildings.

2.1 Existing Sources and Receptors

The Omya LVPP receives ore from the Butterfield, Sentinel and White Knob Quarries. Omya provided information on historical activity levels and equipment that was used to develop a baseline for the Project. In general, the quarries and LVPP consist of operations and equipment that emit fugitive dust and diesel exhaust. Detailed discussion of how the baseline emissions were quantified is presented in Section 5.0.

2.2 Meteorology and Topography

The MDAQMD Guidelines (2011) state:

> *The Mojave Desert Air Basin (MDAB) is an assemblage of mountain ranges interspersed with long broad valleys that often contain dry lakes. Many of the lower mountains which dot the vast terrain rise from 1,000 to 4,000 feet above the valley floor. Prevailing winds in the MDAB are out of the west and southwest. These prevailing winds are due to the proximity of the MDAB to coastal and central regions and the blocking nature of the Sierra Nevada mountains to the north; air masses pushed onshore in southern California by differential heating are channeled through the MDAB. The MDAB is separated from the southern California coastal and central California valley regions by mountains (highest elevation approximately 10,000 feet), whose passes form the main channels for these air masses. The Antelope Valley is bordered in the northwest by the Tehachapi Mountains, separated from the Sierra Nevadas in the north by the Tehachapi Pass (3,800 ft elevation). The Antelope Valley is bordered in the south by the San Gabriel Mountains, bisected by Soledad Canyon (3,300 ft). The Mojave Desert is bordered in the southwest by the San Bernardino Mountains, separated from the San Gabriels by the Cajon Pass (4,200 ft). A lesser channel lies between the San Bernardino Mountains and the Little San Bernardino Mountains (the Morongo Valley).*
>
> *During the summer the MDAB is generally influenced by a Pacific Subtropical High cell that sits off the coast, inhibiting cloud formation and encouraging daytime solar heating. The MDAB is rarely influenced by cold air masses moving south from Canada and Alaska, as these frontal systems are weak and diffuse by the time the reach the desert. Most desert moisture arrives from infrequent warm, moist and unstable air masses from the south. The MDAB averages between three and seven inches of precipitation per year (from 16 to 30 days with at least 0.01 inches of precipitation). The MDAB is classified as a dry-hot desert climate (BWh), with portions classified as dry-very hot desert (BWhh), to indicate at least three months have maximum average temperatures over 100.4° F.*

2.3 Ambient Air Quality

Appendix C contains the airborne pollutant concentration data and number of days exceeding each Ambient Air Quality Standard (AAQS). Table 1 summarizes the maximum short term and annual average ambient concentrations measured during the last five years (2010 to 2014).

The closest air monitoring station to the Project is located at the Lucerne Valley Middle School and measures only PM_{10}. PM_{10} has standards with 24-hour (state and federal) and annual (state) averaging periods. Maximum concentrations at this station were less than both state and federal 24-hour standards in four of the last five years with 2013 exceeding both standards due to an exceptional event (e.g., forest fire). 24-hour concentrations were in the range of 30 to 50 $\mu g/m^3$ with exception of 2013 which is reported to be 143 $\mu g/m^3$. Annual average concentrations for the last five years were in the range of 14 to 17 $\mu g/m^3$. There was insufficient data available to determine the number of days exceeding the 24-hour standard in three (state) and four (federal) of the last five years but maximum 24-hour concentrations and the number of measurements made (i.e., Year Coverage column in Appendix C) indicate that there were few, if any, days exceeding the PM_{10} standards.

The Hesperia-Olive Street monitoring station is the closest location where ozone is monitored. Ozone has standards with 1-hour (state) and 8-hour (state and federal) averaging periods. Maximum concentrations at this station exceeded the state 1-hour and both 8-hour standards in each of the last five years with 1-hour concentrations ranging from 0.100 to 0.132 ppm and 8-hour concentrations ranging from 0.085 to 0.114 ppm. Ozone concentrations exceeded the state 1-hour standard between 1 and 24 days per year. The state 8-hour standard was exceeded between 35 and 101 days per year and the federal 8-hour standard was exceeded between 12 and 67 days per year (Appendix C).

The Victorville monitoring station collects a full suite of pollutants and is the closest station to monitor for CO, NO_2 and SO_2. CO has 1-hour and 8-hour standards (state and federal) while NO_2 has 1-hour and annual average standards (state and federal) and SO_2 has 1-hour, 24-hour (state and federal), and annual average. There was insufficient data to determine the maximum 1-hour carbon monoxide concentration at any monitoring station in the County. 8-hour carbon monoxide concentrations ranged from 1.51 ppm to 5.17 ppm with insufficient data in 2013 and 2014 to determine the maximum 8-hour concentration. Maximum 1-hour NO_2 concentrations ranged from 0.050 to 0.065 ppm and annual average NO_2 concentrations ranged from 0.013 to 0.015 ppm. Neither CO nor NO_2 exceeded a standard on any day in the last five years which is consistent with the fact that the entire state is in attainment for the two pollutants.

The South Coast AQMD (SCAQMD) operates a $PM_{2.5}$ monitoring station in the City of Big Bear Lake. $PM_{2.5}$ has state and federal 24-hour and annual average standards. Maximum 24-hour concentrations for $PM_{2.5}$ ranged from 24.2 to 36.4 $\mu g/m^3$ and annual average concentrations ranged from 8.4 to 9.7 $\mu g/m^3$. Three of the five most recent years had insufficient data to produce an annual average value (Appendix C). Resources available reported estimates for the number of days exceeding the 2006 $PM_{2.5}$ 24-hour standard which was updated in 2012. Three of the last five years had insufficient data to determine the number days exceeding the 2006 standard and the two years where data was sufficient to have an estimate were no days in 2011 and 6 days in 2013. The maximum 24-hour concentrations were slightly above the 35 µg/m3 standard (federal) while the annual average concentration was approximately one-quarter of the maximum day concentration which indicates that most days did not exceed the standard. Annual average concentrations were consistently less than the standards (federal and state) for years that had data.

Table 1 Ambient Pollutant Concentrations

Pollutant	Averaging Time	2010	2011	2012	2013	2014
Ozone (ppm)	1-hr (Maximum)	0.119	0.132	0.116	0.100	0.121
	8-hr (Maximum –State)	0.102	0.114	0.097	0.085	0.094
Carbon Monoxide (ppm)	1-hr (Maximum)	*	*	*	*	*
	8-hr (Maximum)	5.17	1.51	1.83	*	*
Nitrogen Dioxide (ppm)	1-hr (98th Percentile)	0.065	0.060	0.050	0.0557	0.0527
	Annual	0.015	0.015	0.013	0.014	0.013
Respirable Particulate Matter (PM_{10}) ($\mu g/m^3$)	24-hr (98th Percentile)	43	33	30	160.2	49.8
	Annual	14.6	13.8	13.9	18.5	16.7
Fine Particulate Matter ($PM_{2.5}$) ($\mu g/m^3$)	High 24-hr	35.4	30.7	36.4	35.5	24.2
	Annual	*	8.4	*	9.7	*
SO_2 (ppb)	1-hr	52	13	*	*	*
	24-hr	7	7	3	2	*
	Annual	0.92	1.44	0.95	1.12	1.12

Notes: *There was insufficient (or no) data available to determine the value.
Ozone concentrations are from Hesperia Monitoring Station operated by MDAQMD.
NO_2, CO, and SO_2 concentrations are from Victorville Monitoring Station operated by MDAQMD.
PM_{10} concentrations are from Lucerne Valley Middle School Monitoring Station operated by MDAQMD.
$PM_{2.5}$ concentrations are from Big Bear City Monitoring Station operated by South Coast AQMD.

2.4 Ambient Health Risk

The MDAQMD does not publish health risk estimates for areas within its jurisdiction. The Project is near the boundary of Mojave Desert and South Coast Air Basins. Thus, the SCAQMD Multiple Air Toxics Exposure Study (MATES) IV risk maps modeled using the most recent OEHHA new methodology (3/2015), show total cancer risk of approximately 152 excess cancer cases per one million people exposed in the Big Bear Lake area is considered representative of conditions in the area of the Project as documented on Figure 3 (Appendix A).

It should be noted that the SCAQMD's MATES Program consists of multiple years of data collection (1986 to present) summarized in most recent report (MATES IV, May 2015). MATES risk estimates are based on ambient air quality monitoring data from several monitoring stations in the South Coast Air Basin. The MATES studies include fixed monitoring sites (where data is collected over multiple years) and microscale or temporary sites where monitoring occurred for a limited time period (six to ten weeks). The nearest fixed air monitoring site to the Project vicinity is the Inland Valley San Bernardino station located at 14360 Arrow Highway in Fontana, CA which is over sixty (60) miles southwest of the Project. The MATES IV study acknowledges "*several uncertainties in estimating air toxics risks. These include uncertainties of the cancer potency of the substances, in estimating of population exposure, and in estimating the level of diesel particulate*" (MATES-IV, May 2015).The ambient health risk identified in Figure 3 (Appendix A) includes projection of risk levels from locations that were monitored to those that were not. This report overlooks these details and considers the risk map published by SCAQMD at face value such that it represents existing conditions at the project site.

Diesel particulate matter (DPM) is identified as a TAC and currently accounts for roughly 68% of the cancer risk from air pollution in urban areas where on-road sources dominate the inventory. Diesel engines are a ubiquitous source and thus it is not surprising that stationary source TAC effects "are generally much lower than region-wide risk levels, region-wide risks tend to overwhelm any potential local 'hot spots.'" (SCAQMD Mates II Study, Section 7.3).

2.5 Effects of Greenhouse Gases

The effect of greenhouse gas emission regulations are potentially far reaching. On December 7, 2009, United States Environmental Protection Agency (US EPA) Administrator Lisa Jackson signed a final action, under Section 202(a) of the Clean Air Act, finding that six key well-mixed greenhouse gases constitute a threat to public health and welfare, and that the combined emissions from motor vehicles cause and contribute to the climate change problem. The "endangerment finding" allows the US EPA to begin regulating the six GHGs that are identified.

Key effects that US EPA claims support the determination that GHGs endanger public health include:

> *"**Temperature**. There is evidence that the number of extremely hot days is already increasing. Severe heat waves are projected to intensify, which can increase heat-related mortality and sickness. Fewer deaths from exposure to extreme cold is a possible benefit of moderate temperature increases. Recent evidence suggests, however, that the net impact on mortality is more likely to be a danger because heat is already the leading cause of weather-related deaths in the United States.*
>
> ***Air Quality**. Climate change is expected to worsen regional ground-level ozone pollution. Exposure to ground-level ozone has been linked to respiratory health problems ranging from decreased lung function and aggravated asthma to increased emergency department visits, hospital admissions, and even premature death. The impact on particulate matter remains less certain.*
>
> ***Climate-Sensitive Diseases and Aeroallergens**. • Potential ranges of certain diseases affected by temperature and precipitation changes, including tick-borne diseases and food and water-borne pathogens, are expected to increase. • Climate change could impact the production, distribution, dispersion and allergenicity of aeroallergens and the growth and distribution of weeds, grasses, and trees that produce them. These changes in aeroallergens and subsequent human exposures could affect the prevalence and severity of allergy symptoms.*

> ***Vulnerable Populations and Environmental Justice**. • Certain parts of the population may be especially vulnerable to climate impacts, including the poor, the elderly, those already in poor health, the disabled, those living alone, and/or indigenous populations dependent on one or a few resources. • Environmental justice issues are clearly raised through examples such as warmer temperatures in urban areas having a more direct impact on those without air-conditioning.*
>
> ***Extreme Events**. Storm impacts are likely to be more severe, especially along the Gulf and Atlantic coasts. Heavy rainfall events are expected to increase, increasing the risk of flooding, greater runoff and erosion, and thus the potential for adverse water quality effects. These projected trends can increase the number of people at risk from suffering disease and injury due to floods, storms, droughts and fires." (EPA's Endangerment Finding - Health Effects Fact Sheet, US EPA).*

2.6 Class I and Class II Wilderness Areas

Class I Wilderness Areas are areas designated in the Clean Air Act (42 USC 7472) including:

- International parks;
- National wilderness areas which exceed 5,000 acres in size;
- National memorial parks which exceed 5,000 acres in size; and
- National parks which exceed 6,000 acres in size.

The Project is within 100 kilometers of the following Class I Wilderness Areas:

- San Gorgonio 18 km.
- San Jacinto 51 km.
- Joshua Tree National Park 53 km.
- Cucamonga 57 km.
- San Gabriel 83 km.

Class I areas are protected from impacts on visibility, ozone phytotoxicity, and deposition of nitrates and sulfates which can acidify water bodies. In addition, the deposition of fugitive dust onto plants is a concern particularly for protected species, such as the carbonaceous plants found near the quarries. The remainder of the SBNF is considered Class II Wilderness.

Good visibility is essential to the enjoyment of national parks and scenic areas. Across the United States, regional haze has decreased the visual range in these pristine areas from 140 miles to 35-90 miles in the West, and from 90 miles to 15-25 miles in the East. This haze is composed of small particles that absorb and scatter light, affecting the clarity and color of what humans see in a vista. The pollutants that create haze (also called haze species) are measurable as sulfates, nitrates, organic carbon, elemental carbon, fine soil, sea salt, and coarse mass. Anthropogenic sources of haze include industry, motor vehicles, agricultural and forestry burning, and dust from soils disturbed by human activities. Pollutants from these sources, in concentrations much lower than those which affect public health, can impair visibility anywhere. Natural forest fires, biological emissions, sea salt and other natural events also contribute to haze species concentrations. Visibility-reducing particles can be transported long distances from where they are generated, thereby producing regional haze. When they are transported to and occur in national parks and wilderness areas, the reduced visibility impairs the quality and the value of the wilderness experience.

Conditions in the San Gorgonio Wilderness Area would be of primary concern for this Project because it is closest and other areas would experience less severe impacts. The environmental setting for each Class I Wilderness Area within California is found in the California Regional Haze Plan. The San Gorgonio Wilderness Area description from this Plan is provided in Appendix D.

The Project is bounded on the south, west, and north by mountainous undeveloped Forest Lands and to the east by patented open space with an active limestone mine called Furnace Canyon Quarry about 0.75 to 1 mile to the northeast. Other than mining, which has historically been active in the area, land use in the rugged mountainous area has been limited to occasional use by hikers and hunters. Off highway vehicle use and fuel wood cutting have increased as more access roads were built.

The "Land Management Plan, Part 2 San Bernardino National Forest Strategy" (USDA, September 2005) defines the project area as the "Desert Rim." The Desert Rim is described as "a high desert, remote, rugged landscape formed by complex geological faulting. Today, the majority of the land is valued in the production of large quantities of high quality, limestone mineral deposits used in the production of pharmaceuticals and cement. These carbonate deposits are also valuable habitat supporting four species of threatened and endangered plants found nowhere else in the world." An intensive collaborative effort led to the development of the Carbonate Habitat Management Strategy (CHMS) in 2003. The CHMS is designed to provide long-term protection for the carbonate endemic plants and also provide for continued long-term mining. Portions of the carbonate habitats are protected from mining impacts in perpetuity within the carbonate habitat reserves dedicated and managed as described in the CHMS.

3.0 REGULATORY SETTING

Regulations that affect air quality consist primarily of those promulgated under federal and state clean air acts as discussed in Section 3.1. Other regulations that affect air quality include those related to federal conformity (Section 3.2), impacts on Class I and Class II Wilderness Areas (Section 3.3), impacts on health risk (Section 3.4), and greenhouse gases (Section 3.5).

3.1 Air Quality Regulatory Framework

The Federal Clean Air Act and the California Clean Air Act each contain comprehensive frameworks for air quality planning and regulation. Title 40 of the Code of Federal Regulations and Title 17 of the California Code of Regulations contain requirements that have been promulgated under authority granted to US EPA and California Air Resource Board (CARB) by the Acts.

Criteria air pollutants include sulfur oxides (SOx), nitrogen oxides (NOx), particulate matter (PM), carbon monoxide (CO), lead (Pb), and ground-level ozone (O_3). AAQS are developed by US EPA and CARB for each of the criteria pollutants. Primary AAQS are designed to protect human health, with an adequate margin of safety, including sensitive populations such as children, the elderly, and individuals suffering from respiratory disease. Secondary AAQS are designed to protect public welfare from any known or anticipated adverse effects of a pollutant (e.g. building facade degradation, reduced visibility, and damage to crops and domestic animals).

AAQS and related monitoring programs are among the many devices established by air quality regulations (40 CFR 50 - 51). Geographic areas called “attainment areas” are classified by US EPA and CARB based on whether the ambient air in the area meets the AAQSs. An “attainment area” is an area in which pollutant concentrations are less than or equal to the AAQS while “non-attainment areas” have pollution levels above the AAQS. State and federal AAQS are shown in Table 2.

In order to make progress towards attainment with the AAQS, each state and air district containing federal non-attainment areas is required to develop a written plan improving air quality in those areas. These plans are called State Implementation Plans (SIP) and Attainment Plans. California’s SIP contains mobile source and consumer product emission control strategies proposed by CARB and a compilation of stationary and area source strategies that have been developed by local air districts under CARB supervision. Through these plans, the state and local air districts outline efforts that they will take to reduce air pollutant concentrations to levels below the standards. Federal and State attainment status designations assigned by US EPA and CARB for the Project area are summarized in Table 3.

California Ambient Air Quality Standards (CAAQS) are generally more stringent than the National Ambient Air Quality Standard (NAAQS). Existing law requires district plans for attaining CAAQS to assess the cost-effectiveness of available and proposed emission control measures. Proposed emission control measures in the Attainment Plans are typically developed into air district rules.

The MDAQMD assists CARB in preparing the State Implementation Plan by preparing Attainment Plans that demonstrate how the Ambient Air Quality Standards will be achieved. The Attainment Plans contain control measures and associated emissions reduction estimates that are to be considered for implementation by adopting rules and other means (e.g., incentive and education programs) by which the MDAQMD will manage the emissions within the jurisdiction. MDAQMD Attainment Plans are listed in Table 3.

Table 2 Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		National Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)[8]	1 Hour	0.09 ppm (180 μg/m³)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 μg/m³)		0.070 ppm (137 μg/ m³)		
Respirable Particulate Matter (PM_{10})[9]	24 Hour	50 μg/m³	Gravimetric or Beta Attenuation	150 μg/m³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	AAM	20 μg/m³		—		
Fine Particulate Matter ($PM_{2.5}$)[9]	24 Hour	—	—	35 μg/m³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	AAM	12 μg/m³	Gravimetric or Beta Attenuation	12 μg/m³		
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m³)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m³)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m³)		9 ppm (10 mg/m³)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m³)		—	—	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm (339 μg/m³)	Gas Phase Chemi-luminescence	100 ppb (188 μg/m³)	—	Gas Phase Chemi-luminescence
	AAM	0.030 ppm (57 μg/m³)		0.053 ppm (100 μg/m³)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 μg/m³)	Ultraviolet Fluorescence	75 ppb (196 μg/m³)	—	Ultraviolet Flourescence; Spectro-photometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 μg/m³)	
	24 Hour	0.04 ppm (105 μg/m³)		0.14 ppm (for certain areas)[10]	—	
	AAM	—		0.030 ppm (for certain areas)[10]	—	
Lead[12,13]	30 Day Average	1.5 μg/m³		—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—	Atomic Absorption	1.5 μg/m³ (for certain areas)[10]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 μg/m³		
Visibility Reducing Particles[14]	8 Hour	See footnote 13	Beta Attenuation and Transmittance through Filter Tape	**No National Standards**		
Sulfates	24 Hour	25 μg/m³	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 μg/m³)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 μg/m³)	Gas Chromatography			

Source: CARB (10/1/2015). Notes: See footnotes on next page. AAM = Annual Arithmetic Mean.

Footnotes for Table 2 Ambient Air Quality Standards:

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For $PM_{2.5}$, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the U.S. EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the U.S. EPA.
8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
9. On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24- hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM_{10} standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively

Table 3 MDAQMD Attainment Status

Standard	MDAQMD Attainment Status
One-hour Ozone (Federal, standard revoked).	Non-attainment; classified Severe-17 (portion of MDAQMD outside of Southeast Desert Modified Air Quality Management Area is unclassified/attainment)
Eight-hour Ozone (Federal 75 ppb)	Non-attainment; classified Severe-15
Eight-hour Ozone (Federal 70 ppb)	Non-attainment is expected. USEPA will designate in 2017 based on conditions in years 2014 through 2016.
Ozone (State)	Non-attainment; classified Moderate
PM_{10} (Federal)	Non-attainment; classified Moderate (portion of MDAQMD in Riverside County is unclassified)
$PM_{2.5}$ (Federal)	Unclassified/attainment
$PM_{2.5}$ (State)	Non-attainment (portion of MDAQMD outside of Western Mojave Desert Ozone Non- attainment Area is unclassified/attainment)
PM_{10} (State)	Non-attainment
Carbon Monoxide (State and Federal)	Attainment
Nitrogen Dioxide (State and Federal)	Attainment/unclassified
Sulfur Dioxide (State and Federal)	Attainment/unclassified
Lead (State and Federal)	Attainment
Particulate Sulfate (State)	Attainment
Hydrogen Sulfide (State)	Unclassified (Searles Valley Planning Area is non-attainment)
Visibility Reducing Particles (State)	Unclassified

Sources: MDAQMD CEQA Guidelines (August 2011), USEPA Green Book (as of October 1, 2015), and CARB Area Designation Maps (June 2013).

Table 4 MDAQMD Attainment Plans

Name of Plan	Date of Adoption	Standard(s) Targeted	Applicable Area	Pollutant(s) Targeted	Attainment Date*
Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Non-attainment Area)	9-Jun-08	Federal eight hour ozone (84 ppb)	Western Mojave Desert Non-attainment Area (MDAQMD portion)	NO_X and VOC	2021
2004 Ozone Attainment Plan (State and Federal)	26-Apr-04	Federal one hour ozone	Entire District	NO_X and VOC	2007
Triennial Revision to the 1991 Air Quality Attainment Plan	22-Jan-96	State one hour ozone	Entire District	NO_X and VOC	2005
Mojave Desert Planning Area Federal Particulate Matter Attainment Plan	31-Jul-95	Federal daily and annual PM_{10}	Mojave Desert Planning Area	PM_{10}	2000
1991 Air Quality Attainment Plan	26-Aug-91	State one hour ozone	San Bernardino County portion	NOx and VOC	1994

* A historical attainment date given in an attainment plan does not necessarily mean that the affected area has been re-designated to attainment.

The MDAQMD Attainment Plans contain the rules proposed for adoption. As this document was being prepared the MDAQMD Rule Development Calendar had last been updated on 5/7/2015 (Appendix E). Current MDAQMD rules that apply to Project sources include:

- **Rule 201 – Permits to Construct** applies to the construction of air emissions sources that are not otherwise exempt under Rule 219.
- **Rule 203 – Permit to Operate** requires air emissions sources that are not exempted by Rule 219 to obtain operating permit.
- **Rule 204 – Requirements** contains rule language describing New Source Review including Best Available Control Technology (BACT) and emissions offset requirements for stationary sources.
- **Rule 401 – Visible Emissions** limits visibility of fugitive dust to less than No. 1 on the Ringlemann Chart (i.e. 20% opacity).
- **Rule 402 – Nuisance** applies when complaints from the public are received by the District.
- **Rule 403 – Fugitive Dust** prohibits visible dust beyond the property line of the emission source, requires "every reasonable precaution" to minimize fugitive dust emissions and prevent trackout of materials onto public roadways, and prohibits greater than 100 $\mu g/m^3$ difference between upwind and downwind particulate concentrations.
- **Rule 403.2 – Fugitive Dust Control for the Mojave Desert Planning Area (MDPA)** contains the following requirements applicable to limestone processing facilities:
  a. Stabilize industrial unpaved roads carrying more than ten vehicle trips per day with the majority of those vehicles weighing 30 tons or more;
  b. Enclose exterior belt conveyors sufficiently to cover the top and sides of the bulk material being transferred, or employ an alternate dust suppression system sufficient to prevent visible fugitive dust.
  c. Manage or treat bulk material open storage piles sufficiently to prevent visible fugitive dust emissions. For purposes of this Rule, active watering during visible dusting episodes shall be sufficient to maintain compliance;
  d. Cover loaded bulk material haul vehicles while traveling upon publicly maintained paved surfaces;
  e. Employ a dust suppression system at bulk material transfer points sufficient to prevent visible fugitive dust;
  f. Stabilize or eliminate bulk material open storage piles that have been or are expected to be inactive for at least one year;
  g. Stabilize as much unpaved operations area as is feasible;
  h. Vacuum sweep bulk material spills on paved surfaces weekly or more often, as needed;
  i. Prevent facility-related bulk material trackout on publicly maintained paved surfaces;
  j. Clean up facility-related bulk material trackout and spills on publicly maintained roads within twenty-four hours; and
  k. Employ belt cleaners and/or conveyor return scrapers to minimize conveyor spillage.

- **Rule 404 – Particulate Matter Concentration** sets concentration limits based upon the flow rate of the discharge. The concentration limits would apply to discharge from a stack (e.g. baghouse).
- **Rule 405 – Solid Particulate Matter Weight** limits emissions based upon the weight of material processed.
- **Regulation IX – Standards of Performance for New Stationary Sources (NSPS)** incorporates Federal regulation (40 CFR 60) which affects the construction of emissions units. Requirements may or may not apply depending upon the size, construction and manufacture date of equipment that will be used. Specifically, NSPS OOO (40 CFR 60.670) applies to equipment in non-metallic mineral processing plants.
- **Regulation XIII – New Source Review** contains a number of rules that are applied to new and modified sources.
- **Rule 1160 – Internal Combustion Engines** limits emissions of NOx, CO, and VOC from stationary engines.
- **Rule 1520 – Control of Toxic Air Contaminants from Existing Sources** implements AB 2588 Air Toxics Hot Spots requirements.
- **Rule 2002 – General Federal Actions Conformity** requires federal actions to conform to the applicable implementation plan.

In addition to the adopted rules and regulations listed above, MDAQMD has proposed amendments to Rule 1160 and the Rule Development Calendar (Appendix D) contains several of the above listed rules that are scheduled to be amended (i.e., 401, 403, and 403.2). Each potential rule change is described briefly as follows:

- **Rule 401 – Visible Emissions** would be amended to exempt sandblasters and pile drivers pursuant to be consistent with state law and would incorporate references to EPA Test Methods 9 and 22 (i.e., visual emissions evaluation). The SIP would be updated with the amended Rule and South Coast AQMD Rule 401 references in Riverside County SIP would be removed.
- **Rule 403 – Fugitive Dust** control measures would be analyzed for cost effectiveness and the Rule amended if necessary. The SIP would be updated with the amended Rule and South Coast AQMD Rules 403 and 403.1 references in Riverside County SIP would be removed.
- **Rule 403.2 – Fugitive Dust Control for the Mojave Desert Planning** control measures would be analyzed for cost effectiveness and the Rule amended to reflect findings and conform with PM Attainment Plan requirements. The SIP would be updated with the amended Rule and South Coast AQMD Rules 403 and 403.1 references in Riverside County SIP would be removed.
- **Rule 1160 – Internal Combustion Engines** is proposed to be amended as needed to address federal reasonably available control technology (RACT) and may expand scope to include engines between 50 and 500 hp. Particulate matter control measures would be assessed for cost effectiveness and the Rule updated to conform with state and federal rules that apply to affected sources (i.e., ATCM, NESHAP and NSPS). The SIP would be updated with the amended Rule and South Coast AQMD Rules 1110, 1110.1, 1110.2 references in Riverside County SIP would be removed.

3.2 Conformity

A project is conforming if it complies with all applicable District rules and regulations, complies with all proposed control measures that are not yet adopted from the applicable plan(s), and is consistent with the growth forecasts in the applicable plan(s) (or is directly included in the applicable plan). A project is non-conforming if it conflicts with or delays implementation of any applicable attainment or maintenance plan. Conformity with growth forecasts can be established by demonstrating that the project is consistent with the land use plan that was used to generate the growth forecast. An example of a non-conforming project would be one that increases the gross number of dwelling units, increases the number of trips, and/or increases the overall vehicle miles traveled in an affected area (relative to the applicable land use plan).

Federal Conformity regulation (40CFR93) and MDAQMD Rule 2002 which mirrors the federal regulation were adopted in order to ensure that federal actions conform to the applicable implementation plan. Federal actions where the total of direct and indirect emissions in a nonattainment or maintenance area is less than specified rates would screen out of conformity analysis. As presented in Table 3, the western area of the MDAQMD where the Project is located is severe non-attainment for federal ozone, and moderate non-attainment for federal PM_{10}. On the basis of those attainment designations, the Project would screen-out of conformity analysis if:

- NOx and VOC emissions are less than 25 tons per year each;
- PM_{10} emissions are less than 100 tons per year; and
- Emissions are less than 10% of the non-attainment area emissions inventory.

3.3 Federal Land Managers' Air Quality Related Values

The Federal Land Manager (FLM) and the Federal official with direct responsibility for management of Federal Class I parks and wilderness areas (i.e., Park Superintendent, Refuge Manager, Forest Supervisor) have an affirmative responsibility to protect the Air Quality Related Values (AQRVs) (including visibility) of such lands, and to consider whether a proposed project with emissions exceeding the "major" source thresholds will have an adverse impact on such values. The FLM's decision regarding whether there is an adverse impact is then conveyed to the permitting authority for consideration in its determinations regarding the permit. The permitting authority's determinations generally consider a wide range of factors, including the potential impact of the new source or major modification on the AQRVs of Class I areas, if applicable.

At the request of both State permitting agencies and permit applicants, the FLMs formed the Federal Land Managers' Air Quality Related Values Work Group (FLAG) to provide better consistency pertaining to their role in the review of new source permit applications near Federal Class I areas. The purpose of FLAG is twofold: (1) to develop a more consistent and objective approach for the FLMs to evaluate air pollution effects on public AQRVs in Class I areas, including a process to identify those resources and any potential adverse impacts, and (2) to provide state permitting authorities and potential permit applicants consistency on how to assess the impacts of new and existing sources on AQRVs in Class I areas.

The FLMs are also concerned about resources in Class II parks and wilderness areas because they have other mandates to protect those areas as well. The information and procedures outlined in the FLAG Report are generally applicable to evaluating the effect of new or modified sources on the AQRVs in both Class I and Class II areas, including the evaluation of effects as part of Environmental Assessments (EA) and/or Environmental Impact Statements (EIS) under the National Environmental Policy Act (NEPA). However, FLAG does not preclude more refined or regional analyses being performed under NEPA or other programs.

The FLAG 2010 Phase I Report update recommends how to evaluate visibility, ozone phytotoxicity, and deposition impacts from new or modified sources. The FLAG Phase I Report recommends that an applicant apply the "Q/D test" for proposed sources greater than 50 km from a Class I area to determine whether or not any further analysis is necessary. The Q/D test sums emissions of SO_2, NOx, PM_{10}, and H_2SO_4 (i.e. Q in tons per year) and then divides that total by the distance between the source and receptor (D in kilometers). Results equal to or less than 10 do not require further assessment (i.e. $Q/D \leq 10$).

3.4 Health Risk

Toxic air contaminants (TACs) are pollutants listed by the State of California that pose acute, chronic, and/or cancer health risks to exposed individuals. Hazardous air pollutants (HAP) are pollutants listed by US EPA that pose acute, chronic, and/or cancer health risks to exposed individuals. The TACs list includes all HAPs plus California specific air toxics constituents.

The California Office of Environmental Health Hazard Assessment (OEHHA) is responsible for developing the scientific basis for listing and evaluation of health risk from TACs. CARB is responsible for quantifying TAC emissions and controlling TACs by promulgation and enforcement of air toxic control measures (ATCM). Assembly Bill 1807 (AB1807) passed in 1983 requires the state of California to identify and control TACs. TACs are formally identified through a detailed process which starts when a chemical's risk to human health and the environment is above certain criteria. Once TACs are identified, the emission sources, controls, technologies and costs are reviewed to determine if regulation is needed to reduce emissions. In 1993, AB 1807 was amended by passage of Assembly Bill 2728 (AB 2728) which requires the State to list the 189 federal HAPs in the TAC list.

In 1987, the AB 2588 air toxics "hot spots" program was established. This program requires subject facilities to report their air toxics emissions, determine localized health risks, and notify nearby residents for whom risk may exceed the notification level.[1] The program was amended in 1992 to require facilities to reduce high risks (e.g. in the Mojave Desert AQMD, high risks are greater than 100 in 1 million cancer risk; or 10 hazard index) through the development of a risk management plan. The Hotspots Analysis and Reporting Program (HARP) is a software program that calculates TAC emission inventories and performs health risk assessments for use in the AB 2588 Program.

In 2015, after preparation of numerous technical support documents and to address the mandate of the Children's Environmental Health Protection Act of 1999; new versions of the Air Toxics Hot Spots Program Guidance Manual (HRA Guidelines) and HARP software (i.e., HARP 2) were released. These resources were used in preparation of the health risk assessment for this Project which is discussed in Section 5.5.

The Off-Road Vehicle Regulation (13 CCR 2449) was adopted by the CARB in 2007 to reduce diesel particulate matter (PM) and oxides of nitrogen (NOx) emissions from in-use off-road heavy-duty diesel vehicles in California. The regulation was amended by the CARB in December 2010. Prior to that time, the regulation phased in from 2010 to 2020; but the December 2010 rulemaking pushed the start date back to 2014 and the date of final implementation back to 2024. In addition, until CARB receives a waiver

[1] http://www.arb.ca.gov/ab2588/district_levels.htm

from US EPA to regulate in-use off-road engines, the provisions that require further control are not enforceable. Registering fleets through the Diesel Off-road On-line Reporting System (DOORS), labeling equipment, idling limits and sale notification are requirements of the Off-Road Regulation that are still in effect. Regulatory Advisory 10-414 describes the enforcement delay and was last updated in May 2011.

The On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation (13 CCR 2025) was adopted in December 2010. The regulation requires diesel trucks and buses that operate in California to be upgraded to reduce emissions. Heavier trucks must be retrofitted with PM filters beginning January 1, 2012, and older trucks must be replaced starting January 1, 2015. By January 1, 2023, nearly all trucks and buses will need to have 2010 model year engines or equivalent. The regulation applies to nearly all privately and federally owned diesel fueled trucks and buses and to privately and publicly owned school buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds.

Portable engines are regulated by an air toxic control measure (17 CCR 93116) that limits diesel particulate matter and may also be regulated by the Portable Equipment Registration Program (PERP) or local air district permit. In-use portable engines regulated by the ATCM begin phasing in controls to meet emissions reductions criteria on January 1 of 2013, 2017, and 2020. By 2020, in-use portable engines will have Tier 4 particulate emissions characteristics. The PERP program requires applications for new registrations are accepted only for engines that emit less than the interim Tier 4 standards.

3.5 Greenhouse Gas Regulations

3.5.1 Federal

On May 13, 2010 US EPA finalized the GHG Tailoring Rule (75 FR 31514, June 3, 2010). The Tailoring Rule set major source emissions thresholds that defined when federal operating permits under Prevention Significant Deterioration (PSD) or Title V would be required. Then, on June 23, 2014, the U.S. Supreme Court issued its decision in *Utility Air Regulatory Group v. EPA, 134 S.Ct. 2427 (2014)* ("*UARG")*. The Court held that EPA may not treat GHGs as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits that are otherwise required (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of Best Available Control Technology (BACT). In accordance with the Supreme Court decision, on April 10, 2015, the D.C. Circuit issued an amended judgment in *Coalition for Responsible Regulation, Inc. v. Environmental Protection Agency,* Nos. 09-1322, 10-073, 10-1092 and 10-1167 (D.C. Cir. April 10, 2015), which, among other things, vacated the PSD and title V regulations under review in that case to the extent that they require a stationary source to obtain a PSD or title V permit solely because the source emits or has the potential to emit GHGs above the applicable major source thresholds. The D.C. Circuit also directed EPA to consider whether any further revisions to its regulations are appropriate in light of *UARG*, and if so, to make such revisions. In response to the Supreme Court decision and the D.C. Circuit's amended judgment, the EPA will likely conduct future rulemaking action to make appropriate revisions to the PSD and operating permit rules.

On August 3, 2015, EPA announced the Clean Power Plan. The Clean Air Act – under section 111(d) – creates a partnership between EPA, states, tribes and U.S. territories – with EPA setting a goal and states and tribes choosing how they will meet it. The Clean Power Plan follows that approach. EPA is established interim and final carbon dioxide (CO_2) emission performance rates for two subcategories of fossil fuel-fired electric generating units (EGUs): fossil fuel-fired electric steam generating units (generally, coal- and oil-fired power plants); and natural gas-fired combined cycle generating units. To maximize the range of choices available to states in implementing the standards and to utilities in meeting them, EPA is established interim and final statewide goals in three forms:

- A rate-based state goal measured in pounds per megawatt hour (lb/MWh);
- A mass-based state goal measured in total short tons of CO2; and
- A mass-based state goal with a new source complement measured in total short tons of CO2.

States are expected to develop and implement plans to ensure that power plants in their state – either individually, together or in combination with other measures – achieve the interim CO_2 emissions performance rates over the period of 2022 to 2029 and the final CO_2 emission performance rates, rate-based goals or mass-based goals by 2030.

3.5.2 California

CARB approved the AB 32 Scoping Plan at the Board hearing on December 12, 2008. The Scoping Plan contains the main strategies that California will use to reduce GHGs as required by AB 32. On August 24, 2011, the CARB Board approved the Final Supplement to the AB 32 Scoping Plan Functionally Equivalent Document which accounted for progress already made towards reducing statewide GHG emissions and the effect of the severe and prolonged economic downturn that occurred after 2006.

Control measures contained in the Scoping Plan that may affect Project emissions include, but are not limited to:

- **Transportation Measures**. These measures propose to reduce GHG's from vehicles by making vehicles more efficient, reducing the carbon content of the fuels, and reducing the vehicle miles traveled. Thus, vehicles would emit less GHG emissions in the future.
    a. Light Duty Vehicle GHG Standard (T-1). This measure implements AB 1493 (Pavley) standards and planned second phase of the program. Align zero-emission vehicle, and alternative and renewable fuel and vehicle technology programs with long-term climate change goals.
    b. Low Carbon Fuel Standard (T-2). This measure will reduce the carbon intensity of California's transportation fuels by at least ten percent (10%) by 2020. CARB had previously identified this measure as a Discrete Early Action item which will be implemented through a rulemaking by 2010.
    c. Vehicle Efficiency Measures (T-4). This includes measures such as sustainable tire practices, properly inflating vehicle's tires, and possibly fuel-efficient tire standards.
- **Energy Measures**. These measures propose that utility operators replace some fossil fuel electricity generation capacity with renewable sources and reinforces incentives that are offered by local governments to encourage the placement of solar panels on new and existing structures. The Renewables Portfolio Standard (RPS) increases renewables from 12% in the baseline year(s)

to 20% in 2020. The Renewable Electricity Standard (RES) is a separate measure that requires 33% renewables by 2020. The RES is implemented by the California Energy and Public Utilities Commissions under SBX1-2, signed by Governor Brown in April 2011.

The *First Update to the Climate Change Scoping Plan* was adopted on May 22, 2014. The First Update identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. The First Update defines ARB's climate change priorities for the next five years, and also sets the groundwork to reach long-term goals set forth in Executive Orders S-3-05 and B-16-2012. It highlights California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the initial Scoping Plan. It also evaluates how to align the State's "longer-term" GHG reduction strategies with other State policy priorities for water, waste, natural resources, clean energy, transportation, and land use. The First Update covers a range of topics but does not assign specific emission reductions to control measures. The First Update includes:

- An update of the latest scientific findings related to climate change and its impacts, including short-lived climate pollutants.
- A review of progress-to-date, including an update of Scoping Plan measures and other state, federal, and local efforts to reduce GHG emissions in California.
- Potential technologically feasible and cost-effective actions to further reduce GHG emissions by 2020.
- Recommendations for establishing a mid-term emissions limit that aligns with the State's long-term goal of an emissions limit 80 percent below 1990 levels by 2050.
- Sector-specific discussions covering issues, technologies, needs, and ongoing State activities to significantly reduce emissions throughout California's economy through 2050.
- Priorities and recommendations for investment to support market and technology development and necessary infrastructure in key areas.
- A discussion of the ongoing work and continuing need for improved methods and tools to assess economic, public health, and environmental justice impacts.

On April 29, 2015, the Governor issued Executive Order B-30-15 establishing a mid-term GHG reduction target for California of 40 percent below 1990 levels by 2030. All state agencies with jurisdiction over sources of GHG emissions were directed to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 targets. ARB was directed to update the AB 32 Scoping Plan to reflect the 2030 target.

On October 1, 2015, CARB held the Kickoff Public Workshop for the next Scoping Plan update that will reflect the 2030 Target of reducing GHG emissions to 40% below 1990 levels by 2030. Achieving the 2030 target will be done by the continuation of programs established to reach the previously set 2020 GHG emissions reduction target. At the Workshop CARB staff gave slide presentation that indicates achieving the 2030 Target will be accomplished by "continuation of programs established to reach the 2020 GHG emissions reduction target" including:

- Cap-and-Trade Program;
- Low Carbon Fuel Standard;
- Renewable Portfolio Standard;
- Advanced Clean Cars Program;
- Zero Emission Vehicles (ZEV) Program;

- Sustainable Freight Strategy;
- Short-Lived Climate Pollutant Strategy; and
- SB 375 Sustainable Communities Strategy.

Measures that will be developed to reduce GHG emissions are planned for development as follows:

- Governor's Office pillars framework including:
  - Reduce petroleum use;
  - Increase renewable electricity;
  - Increase building energy efficiency;
  - Reduce short-lived climate pollutants; and
  - Ensure natural/working lands are carbon sink.
- Sector oriented measures.
- Maximize GHG reductions across all areas and realize co-benefits at large industrial sources.
- Multi-agency collaborative process.
- Stakeholder input through public workshops with formal and informal comment periods.

On September 30, 2015, CARB posted the Draft Short-Lived Climate Pollutant Reduction Strategy. The Strategy states:

> *The only practical way to rapidly reduce the impacts of climate change is to employ strategies built on the tremendous body of science. The science unequivocally underscores the need to immediately reduce emissions of Short-Lived Climate Pollutants (SLCPs), which include black carbon (soot), methane (CH_4), and fluorinated gases (F-gases, including hydrofluorocarbons, or HFCs). They are powerful climate forcers and dangerous air pollutants that remain in the atmosphere for a much shorter period of time than longer-lived climate pollutants, such as CO_2, and are estimated to be responsible for about 40 percent of current net climate forcing. While the climate impacts of CO_2 reductions take decades or more to materialize, cutting emissions of SLCPs can immediately slow global warming and reduce the impacts of climate change.*

Control measures included in the Draft SLCP Reduction Strategy are as follows:

- Carbon black (non-forest) measures:
  - Residential fireplace and woodstove conversion.
  - Sustainable freight strategy State Implementation Plans clean energy goals.
- Methane reduction measures:
  - Dairy manure management.
  - Dairy and livestock enteric fermentation.
  - Landfill gas management.
  - Oil and gas production, processing and storage.
  - Wastewater, industrial and other sources.
- Fluorinated gas reduction measures:
  - Financial incentive for low-GWP refrigeration early adoption.
  - HFC supply phasedown.
  - Sales ban of very-high GWP refrigerants.
  - Prohibition on new equipment with high-GWP compounds.

Senate Bill 375 (SB 375) "Transportation planning: travel demand models: sustainable communities strategy: environmental review" was signed by the Governor on September 30, 2008. SB 375 is most concerned with automobile and light truck traffic, but the goal of reducing GHGs covers all transportation sources based on the need for sustainable communities.

> *"each transportation planning agency … shall prepare and adopt a regional transportation plan directed at achieving a coordinated and balanced regional transportation system, including, but not limited to, mass transportation, highway, railroad, maritime, bicycle, pedestrian, goods movement, and aviation facilities and services." (Section 65080(a), underline added.)*

The regional transportation plan is to be an internally consistent document and include a sustainable communities strategy (SCS).

> *"The sustainable communities strategy shall …(v) gather and consider the best practically available scientific information regarding resource areas and farmland in the region …." (Section 65080(b)(2)(B)(v), underline added.)*
>
> *Resource areas include: "areas of the state designated by the State Mining and Geology Board as areas of statewide or regional significance pursuant to Section 2790 of the Public Resources Code, and lands under Williamson Act contracts." (Section 65080.01(a)(4).)*

Thus, SB 375 recognizes the limestone deposits as a regionally significant resource that requires special consideration in transportation and land use planning efforts.

3.5.3 San Bernardino County

The County of San Bernardino has prepared a Climate Action Plan (CAP, 2011) that excludes sources which would be considered part of the Project. The CAP assesses *"GHG emissions in two distinct ways: (1) through the exercise of its land use authority it can affect community/external emissions; (2) through its management of County government and facilities it can affect municipal/internal emissions. The External Inventory includes GHG emissions from land uses within the County's unincorporated areas where the County has jurisdictional land use authority*." (CAP, Page 2-1). The CAP does not affect emissions from projects that are in within incorporated cities, within the National Forest, or on lands held by the Department of Defense. Thus, the CAP is not applicable to the Project. Moreover, the CAP does not propose reducing emissions from stationary sources like the Project. (CAP Table 4-1, Page 4-2). Lastly, the CAP was prepared before the 2011 Scoping Plan Update was published which lowered the amount of GHG reductions needed by 2020 from 31% to 16%. The County of San Bernardino updated the Development Review Processes (3/2015) which are applied to discretionary projects that are within the above scope of applicability. If the CAP were applicable to the Project, then the commercial/industrial performance standards listed below would need to be implemented:

- Waste stream reduction by providing tenants and employees County-approved informational materials.
- Vehicle trip reduction by providing tenants and employees County-approved informational materials.
- Other educational materials.
- Landscape equipment would be at least 20% electric-powered.

- Construction standards ranging from use of approved architectural coatings, low-GHG equipment, training on job efficiency for equipment operators, idling limits consistent with existing state law, non-peak hour truck activity, limited queuing of trucks, waste reduction, contractor support for ridesharing and transit.
- Building design standards including compliance with Title 24 energy efficiency requirements; low flow plumbing fixtures; insulated hot water plumbing and energy efficient boilers; lighting design that incorporates natural light, compact fluorescent light bulbs or equivalent, multi-zone programmable dimming systems, and solar panels providing a minimum of 2.5% of the on-site electricity needs; orientation of building to best utilize natural cooling/heating, reflective roofing materials, low maintenance building materials, at least 75% oval or round air ducting with testing showing that system sealed, Energy Star appliances, and building automation system; landscaping with drought tolerant and smog tolerant vegetation with shade trees around buildings; computerized irrigation systems that adjusts for weather conditions; exterior storage areas for recyclables and green waste; transportation demand management that reduces trips 20% by inclusion of bicycle parking, carpool/vanpool spaces, and mass-transit facilities (if available).

4.0 SIGNIFICANCE THRESHOLDS

Significance thresholds for evaluating potential air quality impacts associated with the Project were developed from Environmental Checklist Form (State CEQA Guidelines, Appendix G), the MDAQMD CEQA and Federal Conformity Guidelines, and the San Bernardino County GHG Reduction Plan.

4.1 Air Quality

The Environmental Checklist Form (State CEQA Guidelines, Appendix G) contains the following guidance for air quality impacts assessment:

> *Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:*
>
> *a) Conflict with or obstruct implementation of the applicable air quality plan?*
> *b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?*
> *c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?*
> *d) Expose sensitive receptors to substantial pollutant concentrations?*
> *e) Create objectionable odors affecting a substantial number of people?*

MDAQMD CEQA and Federal Conformity Guidelines provide the following text which describes the significance criteria that have been established by that agency:

> *Any project is significant if it triggers or exceeds the most appropriate evaluation criteria. The District will clarify upon request which threshold is most appropriate for a given project; in general, the emissions comparison (criteria number 1) is sufficient:*

1. *Generates total emissions (direct and indirect) in excess of the thresholds given in [Table 5];*
2. *Generates a violation of any ambient air quality standard when added to the local background;*
3. *Does not conform with the applicable attainment or maintenance plan(s);*
4. *Exposes sensitive receptors to substantial pollutant concentrations, including those resulting in a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (HI) (non-cancerous) greater than or equal to 1.*

A significant project must incorporate mitigation sufficient to reduce its impact to a level that is not significant. A project that cannot be mitigated to a level that is not significant must incorporate all feasible mitigation. Note that the emission thresholds are given as a daily value and an annual value, so that multi-phased project (such as project with a construction phase and a separate operational phase) with phases shorter than one year can be compared to the daily value.

Table 5 Significant Emissions Thresholds

Criteria Pollutant	Annual Threshold (tons)	Daily Threshold (pounds)
Carbon Monoxide (CO)	100	548
Oxides of Nitrogen (NO_X)	25	137
Volatile Organic Compounds (VOC)	25	137
Oxides of Sulfur (SO_X)	25	137
Particulate Matter (PM_{10})	15	82
Particulate Matter ($PM_{2.5}$)	15	82
Hydrogen Sulfide (H_2S)	10	54
Lead (Pb)	0.6	3

Source: MDAQMD CEQA Guidelines (August 2011) modified by removal of GHG significance criteria which is presented in Section 4.2 below.

As discussed in Section 3.2, a project is non-conforming if it conflicts with or delays implementation of any applicable attainment or maintenance plan. A project is conforming if it complies with all applicable District rules and regulations, complies with all proposed control measures that are not yet adopted from the applicable plan(s), and is consistent with the growth forecasts in the applicable plan(s) (or is directly included in the applicable plan). These criteria are used to assess Project impact and address the Environmental Checklist Form Item a) above.

MDAQMD states that, in general, emissions less than those listed in Table 5 will result in less than significant impact on air quality. Thus, regional impacts from a project that adds emissions to the air basin in quantities which are less than those listed in Table 5 would be less than cumulatively considerable. Consideration of thresholds in Table 5 addresses Items b) and c) from the Environmental Checklist Form.

Localized impacts from stationary sources are not addressed by the values in Table 5. The project's modeled concentration of pollutants may not exceed the increment between the AAQS and background concentrations. For pollutants where background already exceeds the AAQS, Significant Impact Levels

(SILs) published by USEPA and neatly summarized by SJVAPCD in Attachment B to their Policy for District Rule 2201 AAQA Modeling (APR 1925, April 14, 2014) are used to evaluate the cumulative impact. Specifically, the SJVAPCD Policy contains separate SILs for point and fugitive sources of PM_{10} and $PM_{2.5}$. SILs are normally used in the context of PSD permitting and represent a de minimis threshold in attainment areas. In non-attainment areas, any additional degradation could be significant and so this AQIA applies the SILs (i.e. de minimis level) as significance thresholds.

The increment and SIL methodologies address the Project impact as well as the cumulative impact on local concentrations satisfying Item b) and partially addressing Item d) in the Environmental Checklist Form. Health risk assessment is required to determine whether risk levels exceed the MDAQMD criteria (see Item 4 in the excerpt above) and address the remaining requirements of Item d) in the Environmental Checklist Form. Lastly, the Project does not emit objectionable odors and so no threshold has been chosen to address Item e) in the Environmental Checklist Form.

4.2 Climate Change

The MDAQMD significance criteria for GHGs (100,000 tons/yr), while higher than other screening criteria (i.e. SCAQMD 10,000 $MTCO_2e$/yr; San Bernardino GHG Plan 3,000 $MTCO_2e$/yr), is applied because it is supported by substantial evidence and most directly applicable to the Project. As discussed previously, the San Bernardino GHG Plan does not apply to the Project because it is located in the National Forest and also because the GHG Plan excludes stationary sources subject to air district permitting.

5.0 ASSESSMENT METHODOLOGY

Emissions were estimated using methods and parameters from the Mineral Industry Emissions Inventory Guidance (Appendix F), AP-42, EMFAC2011, OFFROAD2011, and CalEEMod. Air dispersion/deposition modeling and health risk assessment were then performed to determine the potential for the Project to result in significant localized impacts.

As discussed in Section 1.0, the Project is limited to expanding the Butterfield and Sentinel Quarries areas but overall combined production from all quarries is limited by the LVPP maximum production rate. The Project would allow up to the maximum production rate to be extracted exclusively from the Butterfield and Sentinel Quarries. This would result in no material being quarried at White Knob Quarry which is an indirect effect of the Project that necessitates calculation of White Knob emissions in the baseline.

5.1 Baseline Activity Levels

Appendix F contains information that was provided by Omya. Table 6 presents baseline tonnages for the years 2004 through 2006 that were averaged in order to determine the annual baseline production and throughput. Daily and hourly ore fed to the primary crushers (i.e. Sentinel and White knob) is based on the maximum throughput in each crusher system's permit to operate. Other daily and hourly throughputs are based upon ratio of annual tonnages (i.e. if 20% is waste annually, then 20% daily and hourly is assumed).

Table 6 Baseline Activity Levels

	2004	2005	2006	Baseline (tpy)	Baseline (tpd)	Baseline (tph)
Ore to Primary Crusher						
Sentinel	386,835	467,520	309,880	388,078	5,000	600
Butterfield	0	41,701	128,948	56,883		
Subtotal - Sentinel-Butterfield	386,835	509,221	438,828	444,962	5,000	600
White Knob	309,168	311,999	350,895	324,021	4,000	400
Total	696,004	821,220	789,724	768,982	9,000	1,000
Ore Hauled to Plant						
Sentinel	328,810	397,392	263,398	329,867	4,250	510
Butterfield	0	35,446	109,606	48,351		
Subtotal - Sentinel-Butterfield	328,810	432,838	373,004	378,217	4,250	510
White Knob	262,793	265,199	298,261	275,418	3,400	340
Total	591,603	698,037	671,265	653,635	7,650	850
Waste Total						
Sentinel	204,702	184,440	207,780	198,974	2,822	339
Butterfield	0	59,376	81,624	47,000		
Subtotal - Sentinel-Butterfield	204,702	243,816	289,404	245,974	2,822	339
White Knob	151,860	281,698	130,590	188,049	2,258	226
Total	356,562	525,514	419,994	434,023	5,080	564
Waste Crusher Fines						
Sentinel	58,025	70,128	46,482	58,212	750	90
Butterfield	0	6,255	19,342	8,532		
Subtotal - Sentinel-Butterfield	58,025	76,383	65,824	66,744	750	90
White Knob	46,375	46,800	52,634	48,603	600	60
Total	104,401	123,183	118,459	115,347	1,350	150
TOTAL EXCAVATED	948,165	1,223,551	1,091,259	1,087,658	12,730	1,414

Note: The Project baseline is for Butterfield and Sentinel Quarries only and 378,217 tons per year as shown in this table. The indirect effect of the Project on the LVPP production is relative to the baseline year activity level for the LVPP of 653,635 tons per year shown in this table. The LVPP is physically limited to less than 680,000 tons per year which is the maximum that may be delivered from the Project and doing so would necessitate cessation of operation in the White Knob Quarry which is an indirect effect that is incorporated into this impact assessment.

5.1.1 Vehicles

Vehicle engine size, model year, and hours of operation are presented in Table 7. Some vehicles have no activity. This may be because the equipment was purchased after the baseline years or because the vehicle did not operate in the baseline. Other vehicles were active during the baseline years but have since been retired.

Table 7 Baseline Vehicle Activity

EQUIP #	DOORS #	Type	hp	Engine Year	2006 (hr)	2005 (hr)	2004 (hr)	Average (hr)	Avg. (hp-hr)
330600	3306	Bobcat	50	1983	184.0	109.0	110.0	134.3	6,717
330700	3307	Bobcat	50	1983	177.0	82.0	51.0	103.3	5,167
293301	retired	Bobcat	50	1987	0	0	0	0	0
299100	retired	Bobcat	50	2001	17.0	0	0	5.7	283
205300	retired	Crane	150	1977	0.0	55.0	46.0	33.7	5,050
333018	3418	Dozer	250	1977	31.0	14.0	23.0	22.7	5,667
333062	3462	Dozer	370	1990	30.0	66.0	218.0	104.7	38,727
333064	3464	Excavator	195	1995	278.0	342.0	261.0	293.7	57,265
825400	8254	Forklift	52	1992	129.0	73.0	129.0	110.3	5,737
826800	8268	Forklift	52	2000	1975.0	2279.0	2955.0	2403.0	124,956
826900	8269	Forklift	47	2001	3775.0	3294.0	3913.0	3660.7	172,051
827000	8270	Forklift	52	2003	4316.0	4138.0	4998.9	4484.3	233,184
827200	8272	Forklift	57	2004	2693.0	2192.0	1387.0	2090.7	119,168
208252	retired	Forklift	50	1986	0	124.0	91.0	71.7	3,583
213400	retired	Forklift	50	1989	78.0	55.0	105.0	79.3	3,967
825700	Retired	Forklift	50	1990	0	0	126.0	42.0	2,100
825900	Retired	Forklift	50	1992	0	0	0	0	0
826100	Retired	Forklift	50	1993	0	15.0	244.0	86.3	4,317
826300	Retired	Forklift	50	1994	348.0	351.0	650.0	449.7	22,483
826400	Retired	Forklift	50	1994	564.0	242.0	207.0	337.7	16,883
826500	Retired	Forklift	50	1996	1127.0	1337.0	1008.6	1157.5	57,877
826600	Retired	Forklift	50	1997	1594.0	1010.0	225.6	943.2	47,160
826700	Retired	Forklift	50	1998	1312.0	1683.0	1445.4	1480.1	74,007
61001102	Retired	Generator	890	1992	499.0	470.0	1887.0	952.0	847,280
333410	3410	Grader	275	1987	537.0	725.0	575.0	612.3	168,392
330100	3301	Loader	375	1985	84.0	0.0	0	28.0	10,500
330200	3302	Loader	690	2004	998.0	870.0	554.0	807.3	557,060
298600	3303	Loader	235	1992	239.0	278.0	259.0	258.7	60,787
330500	3305	Loader	690	2004	796.0	715.0	612.0	707.7	488,290
330800	3308	Loader	690	1985	1535.0	834.0	639.0	1002.7	691,840
333046	3346	Loader	690	1995	1225.0	1450.0	1392.0	1355.7	935,410
333060	3360	Loader	690	1994	1107.0	1373.0	1300.0	1260.0	869,400
331200	Retired	Loader	500	1985	0	7.0	1.0	2.7	1,333
207500	Retired	Manlift	150	1999	87.0	0.0	0.0	29.0	4,350
299000	On-road	Dump Truck	300	1988	785.1	731.7	137.5	551.4	165,430
332102	On-road	GreaseTruck	300	1969	25.0	27.0	31.7	27.9	8,370

EQUIP #	DOORS #	Type	hp	Engine Year	2006 (hr)	2005 (hr)	2004 (hr)	Average (hr)	Avg. (hp-hr)
332132	On-road	Lube Van	300	1987	199.0	330.0	320.0	283.0	84,900
332136	On-road	Fuel Truck	300	1973	82.0	108.0	65.0	85.0	25,500
293413	5134	Sweeper	150	1983	0.0	0.0	1.0	0.3	50
826000	Retired	Sweeper	150	1992	0.0	6.0	67.0	24.3	3,650
827100	Retired	Sweeper	150	2002	227.0	911.0	201.0	446.3	66,950
-	2202	Lube Truck	215	1985	0	0	0	0.0	0
-	2232	Lube Truck	322	1988	0	0	0	0.0	0
-	2237	Fuel Truck	370	1994	0	0	0	0.0	0
-	2271	Guzzler	322	2001	0	0	0	0.0	0
-	2290	Dump Truck	425	1989	0	0	0	0.0	0
-	5171	Sweeper	52	2003	0	0	0	0.0	0
330900	3209	Truck	1050	1991	1310.0	1220.0	1386.0	1305.3	1,370,600
333411	3211	Truck	635	2006	739.0	600.0	477.0	605.3	384,387
331600	3216	Truck	938	2000	0	0	0	0.0	0
333251	3251	Truck	1050	1982	2435.0	2472.0	2367.0	2424.7	2,545,900
333252	3252	Truck	1050	2002	2466.0	2914.0	2666.0	2682.0	2,816,100
333053	3253	Truck	635	2004	597.0	1123.0	471.0	730.3	463,762
333254	3254	Truck	1050	2004	2380.0	2837.0	2059.0	2425.3	2,546,600
333255	3255	Truck	1050	2004	2549.0	3281.0	2357.0	2729.0	2,865,450
333256	3256	Truck	1050	1997	2768.0	1715.0	1334.0	1939.0	2,035,950
333257	3257	Truck	760	2000	1143.0	629.0	510.8	760.9	578,309
333091	3291	Truck	635	1992	984.0	1186.0	904.0	1024.7	650,663
333098	3298	Truck	635	1990	638.0	1063.0	418.0	706.3	448,522

5.1.2 Crushing

Primary crushing systems are operated in the Butterfield and Sentinel Quarries area (electrified) and in the White Knob Quarry area (diesel generator, see Table 7). Table 8 presents baseline throughputs for each crushing system and the LVPP. Maximum daily and hourly rates are limited by MDAQMD permits to operate (Appendix G). It is assumed that the crushing systems and LVPP were operated at the maximum permitted daily and hourly rates during the baseline.

Table 8 Baseline Stationary Source Throughputs

Source	kW-hr / ton	Tons / Year	Tons / Day	Tons / Hour
Sentinel Crushing System	0.33	444,962	5,000	600
White Knob Crushing System	0.0	324,021	4,000	400
LVPP	40	653,635	7,650	850

Note: Daily and hourly rates for the crushing systems are based upon permit condition limitations. LVPP daily and hourly rates assume the fraction of waste rock produced annually applies on a daily and hourly basis.

5.1.3 Roads

Dust from paved roads occurs only off-site because on-site roads are unpaved. The average distance from the LVPP to Omya's customers is 110 miles. The baseline production amount (653,635 tons/year) is assumed to be placed in 25 ton capacity trucks. Dust from unpaved roads occurs only on-site because off-site roads are paved. The amount of travel on each unpaved road segment presented in Table 9 is calculated based upon the average truck capacity of 75 tons and the tonnages moved on each road segment in the baseline. Figure 2 (Appendix A) shows the location of each road segment.

Table 9 Baseline Activity on Roads

Road Segment	Length (ft)	VMT/yr	Annual	VMT/day	Daily	VMT/hr	Hourly
A - Butterfield Pit	3,360	1,618	1.2%	15	0.99%	1.8	1.1%
B - Waste Pile	775	963	0.72%	11	0.71%	1.3	0.8%
C - West Road	1,015	1,355	1.0%	16	1.1%	2.0	1.1%
D – Not Used	0	0	0.0%	0	0.00%	0	0.00%
E - Sentinel Pit	3,000	8,013	6.0%	93	6.0%	11	6.4%
F – Not Used	0	0	0.0%	0	0.00%	0	0.00%
G - Sentinel/Butterfield to Plant	38,000	72,587	54%	816	52%	98	56%
H - White Ridge to Plant	24,260	33,746	25%	417	27%	42	24%
I - Plant Feed	365	1,205	0.90%	14	0.91%	1.6	0.9%
J - White Knob Pit	3,725	8,719	6.5%	106	6.8%	11	6.1%
K - On-Road Trucks*	6,186	20,421	*	239	*	27	*
L - Crusher to White Ridge	2,300	5,384	4.0%	66	4.2%	6.6	3.8%
M - White Ridge Pit	1,300	0	0.0%	0	0.00%	0	0.00%
TOTAL*		154,011	100%	1,794	100%	201	100%

Note: Segment K is used for purposes of modeling only and is not included in the total length of roads on-site.

5.1.4 Mining Activities

Mining emissions consist mainly of dust emissions from various sources (e.g. blasting, bulldozing, wind, etc.) and other criteria pollutant emissions from explosives used in blasting (i.e. NOx and CO). Excavated tons from each quarry that were reported in 2008 (Appendix G) and in the baseline were used to create scale factors. Emissions from the 2008 report were then scaled to determine the baseline emissions in

2004 – 2006. The following changes to the 2008 report and assumptions were used in the process of calculating emissions for mining sources:

- Bulldozing reported for the White Knob Quarry was used to scale Sentinel Quarry bulldozing activity because the Sentinel Quarry reported unusually low bulldozing emissions in 2008 and the White Knob bulldozing was judged to be more reflective of typical conditions. The higher activity level is assessed in both the baseline and project scenarios so that the baseline is not inflated for this source.
- Vehicular exhaust and road dust emissions are calculated from scratch except for road dust in the LVPP area that was scaled based on the 2008 emissions.
- Surface areas used for calculation of windblown dust emissions are assigned a scale factor of 1.0 because the size of active areas does not change.
- Control efficiency assigned for chemical dust suppressants on windblown dust from roads was increased from 75% to 90% because the suppressants should be at least as effective as watering which is assigned 90% in the 2008 report.

5.2 Baseline Emissions

Emissions factors presented in Table 10 were calculated for each diesel engine using the methods described in Appendix H. On-road engines were quantified using offroad factors because there are few on-road vehicles and offroad methods result in greater emissions for the same model year engine (i.e. new on-road engines were controlled by regulation before new offroad engines). Vehicles that retired before 2012 were excluded so that the emissions characteristics represent the fleet as it existed at the time the Notice of Preparation was published.

Table 10 Vehicle Emissions Factors

EQUIP #	DOORS #	Type	hp	Engine Year	HC EF (g/hp-hr)	NOx EF (g/hp-hr)	PM EF (g/hp-hr)	CO EF (g/hp-hr)	SO_2 EF (g/hp-hr)	Load Factor
330600	3306	Bobcat	50	1983	2.39	7.13	0.81	8.23	0.00028	0.3685
330700	3307	Bobcat	50	1983	2.39	7.13	0.81	8.23	0.00028	0.3685
293301	Retired	Bobcat	50	1987	-	-	-	-	-	-
299100	Retired	Bobcat	50	2001	-	-	-	-	-	-
205300	Retired	Crane	150	1977	-	-	-	-	-	-
333018	Retired	Dozer	250	1977	-	-	-	-	-	-
333062	3462	Dozer	370	1990	0.67	8.95	0.43	12.78	0.00028	0.4288
333064	3464	Excavator	195	1995	0.71	9.28	0.46	3.38	0.00028	0.3819
825400	8254	Forklift	52	1992	1.11	10.39	0.93	6.32	0.00028	0.201
826800	8268	Forklift	52	2000	1.01	7.90	0.91	4.32	0.00028	0.201
826900	8269	Forklift	47	2001	2.15	6.07	0.79	4.25	0.00028	0.201
827000	8270	Forklift	52	2003	0.94	7.59	0.83	4.13	0.00028	0.201
827200	8272	Forklift	57	2004	0.48	5.95	0.45	4.06	0.00028	0.201

EQUIP #	DOORS #	Type	hp	Engine Year	HC EF (g/hp-hr)	NOx EF (g/hp-hr)	PM EF (g/hp-hr)	CO EF (g/hp-hr)	SO_2 EF (g/hp-hr)	Load Factor
208252	Retired	Forklift	50	1986	-	-	-	-	-	-
213400	Retired	Forklift	50	1989	-	-	-	-	-	-
825700	Retired	Forklift	50	1990	-	-	-	-	-	-
825900	Retired	Forklift	50	1992	-	-	-	-	-	-
826100	Retired	Forklift	50	1993	-	-	-	-	-	-
826300	Retired	Forklift	50	1994	-	-	-	-	-	-
826400	Retired	Forklift	50	1994	-	-	-	-	-	-
826500	Retired	Forklift	50	1996	-	-	-	-	-	-
826600	Retired	Forklift	50	1997	-	-	-	-	-	-
826700	Retired	Forklift	50	1998	-	-	-	-	-	-
61001102	Retired*	Generator	890	1992	0.59	9.12	0.29	13.84	0.00028	0.525
333410	3410	Grader	275	1987	0.86	12.27	0.62	13.84	0.00028	0.4087
330100	3301	Loader	375	1985	0.86	12.27	0.62	14.18	0.00028	0.3618
330200	3302	Loader	690	2004	0.26	4.64	0.14	1.11	0.00028	0.3618
298600	3303	Loader	235	1992	0.76	9.71	0.51	5.53	0.00028	0.3618
330500	3305	Loader	690	2004	0.26	4.64	0.14	1.11	0.00028	0.3618
330800	3308	Loader	690	1985	0.86	12.27	0.62	14.18	0.00028	0.3618
333046	3346	Loader	690	1995	0.69	9.12	0.45	3.34	0.00028	0.3618
333060	Retired	Loader	690	1994	-	-	-	-	-	-
331200	Retired	Loader	500	1985	-	-	-	-	-	-
207500	Retired	Manlift	150	1999	-	-	-	-	-	-
299000	Retired	Dump Truck	300	1988	-	-	-	-	-	-
332102	Retired	GreaseTruck	300	1969	-	-	-	-	-	-
332132	Retired	Lube Van	300	1987	-	-	-	-	-	-
332136	Retired	Fuel Truck	300	1973	-	-	-	-	-	-
293413	5134	Sweeper	150	1983	1.05	13.06	0.74	5.79	0.00028	0.4556
826000	Retired	Sweeper	150	1992	-	-	-	-	-	-
827100	Retired	Sweeper	150	2002	-	-	-	-	-	-
-	2202	Lube Truck	215	1985	0.99	13.06	0.74	5.67	0.00028	0.3417
-	2232	Lube Truck	322	1988	0.69	9.13	0.45	13.84	0.00028	0.3417
-	2237	Fuel Truck	370	1994	0.69	9.12	0.45	13.84	0.00028	0.3417
-	2271	Guzzler	322	2001	0.22	5.10	0.13	1.03	0.00028	0.3417

EQUIP #	DOORS #	Type	hp	Engine Year	HC EF (g/hp-hr)	NOx EF (g/hp-hr)	PM EF (g/hp-hr)	CO EF (g/hp-hr)	SO_2 EF (g/hp-hr)	Load Factor
-	2290	Dump Truck	425	1989	0.69	9.13	0.45	13.84	0.00028	0.3417
-	5171	Sweeper	52	2003	0.93	7.54	0.82	4.10	0.00028	0.3417
330900	3209	Truck	1050	1991	0.59	9.12	0.29	13.84	0.00028	0.3819
333411	3211	Truck	635	2006	0.27	2.66	0.14	1.12	0.00028	0.3819
331600	3216	Truck	938	2000	0.33	7.11	0.20	3.34	0.00028	0.3819
333251	Retired	Truck	1050	1982	-	-	-	-	-	-
333252	3252	Truck	1050	2002	0.33	7.11	0.20	3.34	0.00028	0.3819
333053	3253	Truck	635	2004	0.29	4.73	0.14	1.14	0.00028	0.3819
333254	3254	Truck	1050	2004	0.33	7.11	0.20	3.34	0.00028	0.3819
333255	3255	Truck	1050	2004	0.33	7.11	0.20	3.34	0.00028	0.3819
333256	3256	Truck	1050	1997	0.59	9.29	0.32	13.84	0.00028	0.3819
333257	3257	Truck	760	2000	0.33	7.11	0.20	3.34	0.00028	0.3819
333091	Retired	Truck	635	1992	-	-	-	-	-	-
333098	Retired	Truck	635	1990	-	-	-	-	-	-

* White Knob Generator was replaced by a contractor-owned portable crushing system but the generator emissions rates were analyzed. Classes of units retired (i.e. crane and manlift) replaced by equipment with the same emissions rates.

Emissions factors in Table 10 were combined with activity data in Table 6 to calculate baseline vehicular emissions that are presented in Table 11.

Table 11 Baseline Vehicle Emissions

Location	Type	Avg. (hp-hr)	HC (lb/yr)	NOx (lb/yr)	PM (lb/yr)	CO (lb/yr)	SOx (lb/yr)	CO_2 (tpy)
Pit	Dozer Total	44,393	28	376	18	536	0.012	26
Pit	Excavator Total	57,265	34	447	22	163	0.013	33
Pit	Loader Total	3,543,333	1,468	21,668	950	13,951	0.781	2,064
Plant	Bobcat Total	12,167	24	70	8	81	0.003	7
Plant	Crane Total	5,050	4	46	2	19	0.001	3
Plant	Forklift Total	887,473	447	2,981	308	1,816	0.109	517
Plant	Guzzler Total	0	-	-	-	-	-	-
Plant	Loader Total	71,287	46	625	32	561	0.016	42
Plant	Manlift Total	4,350	2	21	1	9	0.001	3
Plant	Sweeper Total	70,650	62	640	48	307	0.017	41
Roads	Dump Truck Total	165,430	87	1,137	56	1,725	0.034	96
Roads	Fuel Truck Total	25,500	13	175	9	266	0.005	15
Roads	Grader Total	168,392	130	1,862	95	2,101	0.042	98
Roads	Lube Truck Total	93,270	59	780	42	685	0.019	54

Location	Type	Avg. (hp-hr)	HC (lb/yr)	NOx (lb/yr)	PM (lb/yr)	CO (lb/yr)	SOx (lb/yr)	CO_2 (tpy)
Roads	Truck Total	16,706,243	4,897	91,813	2,789	57,696	3.885	9,730
WKQ	Generator Total	847,280	575	8,940	285	13,576	0.271	493
	Grand Total	22,692,682	7,869	131,513	4,663	93,464	5.207	13,217

Note: WKQ = White Knob Quarry.

Table 12 presents the emissions summed by area. Quarry emissions are assumed to occur in locations where material is being excavated (quarries) and deposited (overburden areas). Plant emissions are assumed to occur at the LVPP. Road emissions are further allocated to specific roads based upon the vehicle miles traveled (VMT) presented in Table 9. Figure 2 (Appendix A) shows the location of each road segment. VMT is calculated based upon the tons of material being transported and the capacity of haul trucks.

Table 12 Baseline Vehicle Emissions by Location

	Average (hp-hr)	HC (lb/yr)	NOx (lb/yr)	PM (lb/yr)	CO (lb/yr)	SOx (lb/yr)	CO_2 (tpy)
Quarry Subtotal	3,644,992	1,531	22,491	990	14,650	0.806	2,123
Plant Subtotal	1,041,576	578	4,316	396	2,765	0.144	607
Roads Subtotal	17,158,834	5,186	95,767	2,990	62,474	3.987	9,994
WKQ Generator	847,280	575	8,940	285	13,576	0.271	493
Total	22,692,682	7,869	131,513	4,663	93,464	5.207	13,217

Note: WKQ = White Knob Quarry.

The Roads Subtotal in Table 12 is combined with road dust and offsite haul truck emissions in Table 13.

Table 13 Baseline Emissions on Roads

	On-site	Off-site	Total
VMT (miles/yr)	133,590	5,751,988	5,885,578
TSP – Dust (tpy)	248.44	105.89	354.34
PM_{10} – Dust (tpy)	70.65	21.18	91.83
$PM_{2.5}$ – Dust (tpy)	7.06	5.20	12.26
TSP – Exhaust (tpy)	1.50	4.48	5.97
PM_{10} – Exhaust (tpy)	1.50	4.48	5.97
$PM_{2.5}$ – Exhaust (tpy)	1.38	4.12	5.50
HC (tpy)	2.59	4.13	6.72
NOx (tpy)	47.88	77.94	125.82
CO (tpy)	31.24	18.70	49.94
SOx (tpy)	0.0020	0.10	0.10
CO_2 (tpy)	9,994	10,732	20,725

Table 14 presents mining and processing emissions that were scaled up from the 2008 reporting and adjusted as described previously in this section.

Table 14 Baseline Mining and Processing Emissions

Emission Source / Operation / Activity	LVPP (tons per year)			Butterfield and Sentinel Quarries (tons per year)			White Knob Quarry (tons per year)		
	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$
Drilling	-	-	-	0.31	0.25	0.25	0.23	0.19	0.19
Blasting	-	-	-	14.46	7.52	0.43	5.41	2.81	0.16
Explosives	-	-	-	-	-	-	-	-	-
Bulldozing and Grading	0.185	0.090	0.028	28.27	13.75	4.20	20.99	10.21	3.12
Loading Quarry / Pad	0.0072	0.0035	0.0011	0.39	0.19	0.06	1.65	0.81	0.25
Primary Crushing	-	-	-	8.43	1.48	0.46	11.83	3.83	1.20
Ball Mill #1	1.68	0.106	0.033	-	-	-	-	-	-
Tertiary Crushing	34.7	2.25	0.69	-	-	-	-	-	-
Roller Mill #1	3.61	0.242	0.076	-	-	-	-	-	-
Roller Mill #2	2.66	0.167	0.052	-	-	-	-	-	-
Roller Mill #3	1.62	0.104	0.033	-	-	-	-	-	-
Roller Mill #4	1.60	0.104	0.033	-	-	-	-	-	-
Surface Treating Plant	0.011	0.0010	0.0003	-	-	-	-	-	-
Rock Storage System/Plan	19.5	5.47	1.71	-	-	-	-	-	-
Optical Sorter	0.019	0.014	0.004	-	-	-	-	-	-
Coarse Product Storage System	0.48	0.080	0.025	-	-	-	-	-	-
Silo 81-70c	0.58	0.082	0.026	-	-	-	-	-	-
Bulk Loadout 82 System	0.16	0.025	0.008	-	-	-	-	-	-
Bulk Loadout 83 System	0.028	0.005	0.001	-	-	-	-	-	-
Stockpiles - Wind Erosion	1.06	0.53	0.21	0.67	0.34	0.13	0.18	0.09	0.04
Exhaust - Stationary and Portable Equipment	0.047	0.046	0.046	0.04	0.04	0.04	-	-	-
Exhaust - Mobile and Vehicular Equipment*	-	-	-	-	-	-	-	-	-
Paved Roads - Entrained Dust*	-	-	-	-	-	-	-	-	-
Unpaved Roads - Entrained Dust*	30.84	9.10	1.40	-	-	-	-	-	-
Wind Erosion From Unpaved Operational Areas and Roads	11.25	5.62	2.25	20.10	10.05	4.02	20.66	10.33	4.13
Total	110.03	24.04	6.62	72.66	33.61	9.59	60.96	28.27	9.08

*Engine exhaust and road dust are calculated elsewhere except for road dust in the LVPP facility and portable water pump engines that are scaled from 2008 levels. Windblown dust is not scaled because the area disturbed daily remains unchanged.

Table 15 Baseline Mining and Processing Combustion Emissions

Sources	CO (tpy)	NOx (tpy)	ROG (tpy)	SOx (tpy)
Sentinel Quarry Blasting & Water Pumps	4.2	1.6	0.042	0.037
White Knob Quarry Blasting *	3.71	0.94	0	0
LVPP Heaters	0.12	0.48	0.01	0.01
Total	8.03	3.02	0.052	0.047

Note: White Knob quarry generator emissions are quantified with the offroad vehicle emissions in Table 12.

5.3 Proposed Activity Levels and Emissions

The Project is limited to expanding the Butterfield and Sentinel Quarries area but overall combined production from all quarries is limited by the LVPP maximum production rate. The Project would allow up to the maximum production rate to be extracted exclusively from the Butterfield and Sentinel Quarries. This would result in no material being quarried at White Knob which is an indirect effect of the Project that necessitates calculation of White Knob emissions in the baseline. Moreover, vehicular activity data provided by Omya does not distinguish which units operate in each quarry. Thus, the emissions from vehicles are calculated for the fleet and apportioned to quarries based on throughput amount and to units operating on roads by VMT. Proposed future activity levels are presented in Table 16.

Table 16 Activity Scaling Factors

Source	Baseline Value	Project Value	Scale Factor
LVPP (excludes wind erosion)	653,635 tons/yr	680,000 tons/yr	1.04
LVPP wind erosion	14.88 acres	14.88 acres	1.00
Off-site Road Emissions	3,787,946 VMT/yr	3,940,736 VMT/yr	1.04
On-site Road Emissions	133,590 VMT/yr*	187,084 VMT/yr *	1.40
Vehicles Working in Quarries (based on tons excavated)	1,087,658 tons/yr	1,487,500 tons/yr	1.37
New Mobile Crusher	0 hp-hr/yr	2,084,855 hp-hr/yr	n/a **

* Value calculated based upon tonnage moved, capacity of trucks, and road segments traveled.
** Activity based on White Knob Quarry Crusher activity scaled up for greater production.

Project emissions are calculated in Appendix I and presented in the following tables. Table 17 presents emissions from Project vehicle engines and Table 18 presents potential proposed emissions on roads and the increment from baseline that would result from the Project. Table 19 presents Proposed emissions and incremental Project emissions from mining and processing activities. The White Knob Quarry would have zero emissions because there would be no activity there if the Project maximum were to be quarried from the Butterfield and Sentinel Quarries. Table 20 presents proposed emissions and the Project increment from mining and processing activities.

Table 17 Project Vehicle Emissions by Location

	Average (hp-hr)	HC (lb/yr)	NOx (lb/yr)	PM (lb/yr)	CO (lb/yr)	SOx (lb/yr)	CO_2 (tpy)
Quarry Subtotal	4,984,952	2,093	30,759	1,355	20,035	1.10	2,903
Plant Subtotal	1,093,368	607	4,531	416	2,902	0.15	643
Roads Subtotal	24,029,854	7,262	134,115	4,188	87,490	5.58	13,996
Mobile Crusher	2,084,855	208	5,307	181	6,274	0.67	638
Proposed	**32,193,030**	**10,171**	**174,712**	**6,140**	**116,702**	**7.50**	**18,179**
Baseline*	**22,692,682**	**7,869**	**131,513**	**4,663**	**93,464**	**5.21**	**13,222**
Project Increment	**9,500,348**	**2,301**	**43,199**	**1,477**	**23,237**	**2.30**	**4,957**

Note: * See also Table 12.

Table 18 Proposed Emissions on Roads

	On-site	Off-site	Total	Baseline	Increment
VMT (miles/yr)	187,084	3,940,736	4,127,820	3,921,535	206,285
TSP – Dust (tpy)	348	72.6	420	318	102
PM_{10} – Dust (tpy)	98.9	14.5	113	84.6	28.9
$PM_{2.5}$ – Dust (tpy)	9.89	3.56	13.5	10.5	3.0
TSP – Exhaust (tpy)	2.09	3.07	5.16	4.44	0.72
PM_{10} – Exhaust (tpy)	2.09	3.07	5.16	4.44	0.72
$PM_{2.5}$ – Exhaust (tpy)	1.93	2.82	4.75	4.09	0.66
HC (tpy)	3.63	2.83	6.46	5.31	1.15
NOx (tpy)	67.1	53.4	120	99.2	21
CO (tpy)	43.8	12.8	56.6	43.6	13
SOx (tpy)	0.0028	0.07	0.07	0.07	0.0035
CO_2 (tpy)	13,996	7,339	21,335	17,061	4,274

Note: See also Table 13 and Table 17.

Table 19 Proposed Particulate Matter

Emission Source / Operation / Activity	LVPP (tpy)			Butterfield and Sentinel Quarries (tpy)			White Knob Quarry (tpy)		
	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$
Drilling	-	-	-	0.74	0.60	0.60	-	-	-
Blasting	-	-	-	34.46	17.92	1.03	-	-	-
Explosives	-	-	-	-	-	-	-	-	-
Bulldozing, Scraping And Grading Of Material	0.19	0.09	0.03	67.36	32.77	10.01	-	-	-
Loading Quarry / Pad	0.01	0.00	0.00	0.92	0.45	0.14	-	-	-
Primary Crushing	-	-	-	20.10	3.52	1.09	-	-	-
Ball Mill #1	1.75	0.11	0.03	-	-	-	-	-	-
Tertiary Crushing	36.05	2.34	0.72	-	-	-	-	-	-
Roller Mill #1	3.75	0.25	0.08	-	-	-	-	-	-
Roller Mill #2	2.77	0.17	0.05	-	-	-	-	-	-
Roller Mill #3	1.68	0.11	0.03	-	-	-	-	-	-
Roller Mill #4	1.67	0.11	0.03	-	-	-	-	-	-
Surface Treating Plant	0.01	0.00	0.00	-	-	-	-	-	-
Rock Storage System/Plan	20.33	5.69	1.78	-	-	-	-	-	-
Optical Sorter	0.02	0.01	0.00	-	-	-	-	-	-
Coarse Product Storage System	0.50	0.08	0.03	-	-	-	-	-	-
Silo 81-700	0.60	0.09	0.03	-	-	-	-	-	-
Bulk Loadout 82 System	0.16	0.03	0.01	-	-	-	-	-	-
Bulk Loadout 83 System	0.03	0.00	0.00	-	-	-	-	-	-
Stockpiles - Wind Erosion	1.06	0.53	0.21	0.67	0.34	0.13	-	-	-
Exhaust - Stationary and Portable Equipment	0.05	0.05	0.05	0.09	0.09	0.09	-	-	-
Exhaust - Mobile and Vehicular Equipment*	-	-	-	-	-	-	-	-	-
Paved Roads - Entrained Dust*	-	-	-	-	-	-	-	-	-
Unpaved Roads - Entrained Dust*	32.08	9.47	1.45	-	-	-	-	-	-
Wind Erosion From Unpaved Operational Areas and Roads	11.25	5.62	2.25	20.10	10.05	4.02	-	-	-
Project Total by Area	114	24.8	6.79	144	65.7	17.1	-	-	-
Baseline by Area	110	24.0	6.62	72.7	33.6	9.59	61.0	28.3	9.08
Increment by Area	3.94	0.72	0.17	71.8	32.1	7.52	-61.0	-28.3	-9.08
Increment Total	14.76	4.57	-1.40						

Note: Elimination of windblown dust from White Knob Quarry accounts for beneficial effect on $PM_{2.5}$. See also Table 14.

Table 20 Project Mining and Processing Combustion Emissions

Sources	CO (tpy)	NOx (tpy)	VOC (tpy)	SOx (tpy)
Sentinel Quarry Blasting & Water Pumps	10.02	3.72	0.088	0.0041
White Knob Quarry Blasting	-	-	-	-
LVPP Heaters	0.124	0.497	0.0054	0.132
Proposed	10.15	4.21	0.093	0.136
Baseline	8.03	2.98	0.042	0.13
Project Increment	2.12	1.24	0.051	0.01

Note: see also Table 15.

Table 21 summarizes the incremental change in emissions that would occur if the Project were to operate at the maximum rate of 680,000 tons per year production and 100% of the ore being mined from the Butterfield and Sentinel Quarries.

Table 21 Incremental Change in Emissions from Project

	Total Sentinel Butterfield (tpy)	Total White Knob (tpy)	Total LVPP (tpy)	Total Offsite (tpy)	Total Project without White Knob Reductions (tpy)	Total Project with White Knob Reductions (tpy)
VOC	2.69	-1.54	0.01	0.11	2.82	1.27
NOx	48.1	-26.4	0.10	2.07	50.3	23.9
CO	32.6	-21.1	0.07	0.50	33.1	12.0
SOx	0.0022	-0.0010	0.0000	0.0027	0.0049	0.0038
TSP	262	-151	4.04	2.93	269	118
PM_{10}	87.3	-54.5	0.76	0.68	88.8	34.3
$PM_{2.5}$	14.4	-12.5	0.18	0.25	14.8	2.38
CO_2e	9,900	-4,978	28.3	0.14	9,929	4,951

5.4 Dispersion Modeling

Dispersion modeling was performed in consultation with the EPA Modeling Guidelines (40CFR 51, Appendix W) to determine the concentration of pollutants at receptors located near the Project and to estimate deposition of dust onto carbonaceous plant species which exist within and surrounding the Project. Consistent with the Guidelines, EPA's AERMOD Gaussian plume model was selected for use. AERMOD requires inputs characterizing the model domain, emissions sources, terrain, and meteorological conditions. The model domain was created to encompass the Project site, the White Knob Quarry site, the Omya processing facility, and nearby receptors beyond which pollutant concentrations would decrease with distance from the Project.

5.4.1 Sources

Source characteristics including emissions rates, vertical and lateral dimensions, initial velocity, and location were determined by calculation using methods presented in this report and physical characteristics of each source. The Project includes fugitive area sources and no point sources (i.e., stacks). Initial lateral and vertical dimensions were selected based on engineering judgement regarding the nature of the source(s) being represented and the physical size of the source(s). The maximum size of a volume source in the model is 100 m x 100 m representing the mine pits. By way of comparison, the distance from the any non-haul road source to the nearest receptor exceeds 2,800 meters. Haul road emissions volume sources were converted from line-volume sources having a width and height equal to the road width and off-road truck height. These haul road parameters were converted to model source parameters using EPA approved methods documented in the Haul Road Workgroup Final Report (US EPA, March 2, 2012: https://www3.epa.gov/ttn/scram/reports/Haul_Road_Workgroup-Final_Report_Package-20120302.pdf). The large number of sources in the model, large areas on-site over which mobile equipment works, and relatively large distances to receptors were considered in choosing appropriate sizes for model objects.

In general, area sources and sources operating below the surrounding ground level (i.e., in pits) were assigned zero release height while plant equipment and mobile sources were assigned release heights that reflect the sources' actual height or represent wake off the source consistent with EPA policy for haul roads. Regardless, the property boundary and off-site receptors are at such great distances from the sources that there is no practical difference between 0 and 4.25 m releases. This is particularly true given that the AAQS analysis assumed that dry depletion of the plume would not occur (deposition is a separate model run). Thus, dust hitting the ground is reflected back into the air. The angle at which pollutants disperse in AERMOD results in pollutants hitting the ground within a lateral distance three times greater than the release height. Thus, the plume hits the ground within 13 m (50 feet) of the source and travels along the ground until it reaches the receptor which is no different than being released at ground level when receptors are hundreds of feet or more distant from the sources.

5.4.2 Terrain

Dispersion modeling was performed utilizing flat terrain. Section 4.1 of the AERMOD Implementation Guide (EPA, 12.2016) and other historical guidance documents address modeling sources with terrain-following plumes in sloping terrain.

> "For cases in which receptor elevations are lower than the base elevation of the source (i.e., receptors that are down-slope of the source), AERMOD will predict concentrations

> that are less than what would be estimated from an otherwise identical flat terrain situation….
>
> To avoid underestimating concentrations in such situations, it may be reasonable in cases of terrain-following plumes in sloping terrain to apply the non-DFAULT option to assume flat, level terrain. This determination should be made on a case-by-case basis, relying on the modeler's experience and knowledge of the surrounding terrain and other factors that affect the air flow in the study area, characteristics of the plume (release height and buoyancy), and other factors that may contribute to a terrain-following plume, especially under worst-case meteorological conditions associated with the source." (EPA, 12/2016).

In addition, the South Coast AQMD has the following warning posted on it's website.

> "WARNING: According to the AERMOD Implementation Guide Link to external website. (PDF, 133kb) revised August 3,2015, for cases in which receptor elevations are lower than the base elevation of the source, AERMOD will predict concentrations that are less than what would be estimated from an otherwise identical flat terrain situation. While this is appropriate and realistic in most cases, for cases of down-sloping terrain where the plume is terrain-following, AERMOD will tend to underestimate concentrations when terrain effects are taken into account. In order to avoid underestimating concentrations in such situations, AQMD recommends the following:
>
> 1. If all receptor elevations are lower than the base elevation of the source, the non-default option within AERMOD should be applied to assume flat, level terrain.
> 2. If some receptors are lower and some receptors are higher than the base elevation of the source, AERMOD should be run twice – once using the default option and the second time using the non-default option. The maximum ground-level concentration from both runs should be reported." (http://www.aqmd.gov/home/library/air-quality-data-studies/meteorological-data/modeling-guidance).

Existing guidance supports the use of the non-default FLAT option and it was used so that the modeling would produce conservatively high concentrations and health risks as compared to the default option.

5.4.3 Meteorological Data

Meteorological data was purchased from Lakes Environmental after consultation with the MDAQMD. Existing weather stations for which meteorological data was available from the MDAQMD (Barstow, Hesperia, Lucerne Valley, Phelan, Trona, Twentynine Palms, and Victorville) were determined to be unrepresentative of the Project site conditions because they are located far from the site and in desert valleys whereas the Project site is in the foothills and mountains.

Lakes generated prognostic meteorological data for the five-year period of 2008 through 2012 based on coordinates within the Project area using the Mesoscale Meteorological model, MM5 (Pennsylvania State University / National Center for Atmospheric Research). At the time, MM5 was a non-default option and observed meteorological data from a weather station was the recommended option for AERMOD. However, other EPA recommended models (i.e., grid models CAMX & CalPuff) could use MM5 data and be consistent with the Modeling Guidelines in effect at the time. Nevertheless, the observed weather data was determined by MDAQMD and Sespe to be unrepresentative and the MM5 data was determined likely to be more representative of conditions on-site because MM5 uses observational data from the weather stations and interpolates between them based on relevant factors that affect wind speed and direction (e.g., terrain). EPA's website (https://www.epa.gov/scram/air-modeling-meteorological-grid-models) currently states:

> *"For air quality modeling purposes, meteorological grid models are used in conjunction with chemical interaction models to provide gridded output of chemical species or pollutant data. Meteorological grid models use mathematical formulations that simulate atmospheric processes such as the change of winds and temperature in time. These meteorological parameters are calculated at distinct spatially equidistant points over an area of interest which is called a grid. When these models are applied in a retrospective mode (i.e. modeling a past event) they are able to blend ambient data with model predictions via four-dimensional data assimilation, thereby yielding temporal and spatially complete data sets that are grounded by actual observations.*
>
> *There are several commonly-used meteorological grid models that can develop inputs for air quality models. These grid models differ in their simulation of atmospheric processes but each produce gridded meteorological parameters. There are also several post-processors which are needed to convert the raw meteorological modeling output to suitable air quality model input. A few of the most commonly used meteorological models and post-processors are briefly described below.*
>
> [The MM5 model] … *is a frequently-used meteorological model for historical episodes. It is a limited-area, nonhydrostatic, terrain-following sigma-coordinate model designed to simulate or predict mesoscale and regional-scale atmospheric circulations."*

Meteorological data used in dispersion modeling was chosen based on the EPA Modeling Guidelines in effect at the time (40CFR51 Appendix W) and which have changed slightly to better incorporate prognostic meteorological grid model as a substitute for measured data in cases where the prognostic data would be more representative.

> *The meteorological data used as input to a dispersion model should be selected on the basis of spatial and climatological (temporal) representativeness as well as the ability of the individual parameters selected to characterize the transport and dispersion conditions in the area of concern. The representativeness of the data is dependent on:*
>
> - *proximity of the meteorological monitoring site to the area under consideration;*
> - *complexity of the terrain;*
> - *exposure of the meteorological monitoring site; and*
> - *period of time during which data are collected. (70FR 68243 and 82FR 5222).*
>
> *Spatial representativeness of the data can be adversely affected by large distances between the source and receptors of interest and the complex topographic characteristics of the area. Temporal representativeness is a function of the year-to-year variations in weather conditions. Where appropriate, data representativeness should be viewed in*

> *terms of the appropriateness of the data for constructing realistic boundary layer profiles and three dimensional meteorological fields.* (70FR 68243 and 82FR 5222).

Former EPA Modeling Guidelines (2005) were silent on use of prognostic meteorological data. However, there was no better option at the time modeling was performed and EPA had come to allow its use with AERMOD in certain situations. Subsequently, EPA changed the Modeling Guidelines (2017) related to meteorological data as described in Federal Register preamble to the updated Modeling Guidelines. EPA states:

> *"We made extensive updates and modifications … to reflect current EPA practices, requirements, and recommendations for determining the appropriate modeling domain and model input data from new or modifying source(s) or sources under consideration for a revised permit limit, from background concentrations (including air quality monitoring data and nearby and other sources), and from meteorology….*
>
> *The use of prognostic mesoscale meteorological models to provide meteorological input for regulatory dispersion modeling applications has been incorporated throughout the ''Meteorological Input Data'' subsection, including the introduction of the MMIF as a tool to inform regulatory model applications…."* (82 FR 5201-5202, January 17, 2017).

A portion of the most recent Modeling Guidelines (2017) that addresses how prognostic meteorological data should be evaluated prior to its use is paraphrased below.

> *For some modeling applications, there may not be a representative National Weather Service (NWS) or comparable meteorological station available (e.g., complex terrain), and it may be cost prohibitive or infeasible to collect adequately representative site-specific data. For these cases, it may be appropriate to use prognostic meteorological data, if deemed adequately representative, in a regulatory modeling application. However, if prognostic meteorological data are not representative of transport and dispersion conditions in the area of concern, the collection of site-specific data is necessary.*
>
> *The EPA has developed a processor, the MMIF, to process MM5 (Mesoscale Model 5) or WRF (Weather Research and Forecasting) model data for input to various models including AERMOD. MMIF can process data for input to AERMET or AERMOD for a single grid cell or multiple grid cells. MMIF output has been found to compare favorably against observed data (site-specific or NWS)….* (Section 8.4.5.1, 2017 Modeling Guidelines).
>
> *a.* *<u>Prognostic model evaluation</u>. Appropriate effort by the applicant should be devoted to the process of evaluating the prognostic meteorological data. The modeling data should be compared to NWS observational data or other comparable data in an effort to show that the data are adequately replicating the observed meteorological conditions of the time periods modeled. An operational evaluation of the modeling data for all model years (i.e., statistical, graphical) should be completed. The use of output from prognostic mesoscale meteorological models is contingent upon the concurrence with the appropriate reviewing authority that the data are of acceptable quality, which can be demonstrated through statistical comparisons with meteorological observations aloft and at the surface at several appropriate locations.*

b. *Representativeness. When processing MMIF data for use with AERMOD, the grid cell used for the dispersion modeling should be adequately spatially representative of the analysis domain. In most cases, this may be the grid cell containing the emission source of interest. Since the dispersion modeling may involve multiple sources and the domain may cover several grid cells, depending on grid resolution of the prognostic model, professional judgment may be needed to select the appropriate grid cell to use. In such cases, the selected grid cells should be adequately representative of the entire domain.*

c. *Grid resolution. The grid resolution of the prognostic meteorological data should be considered and evaluated appropriately, particularly for projects involving complex terrain. The operational evaluation of the modeling data should consider whether a finer grid resolution is needed to ensure that the data are representative. The use of output from prognostic mesoscale meteorological models is contingent upon the concurrence with the appropriate reviewing authority that the data are of acceptable quality.* (Section 8.4.5.2, 2017 Modeling Guidelines).

In summary, the meteorological dataset used in AERMOD to estimate pollutant concentrations was appropriately selected and more representative of conditions on-site and at receptor locations than observational data that could have been used. A co-benefit of purchasing MM5 data was that the electronic file format enabled use of AERMOD which was EPA's preferred model at the time and remains the preferred model today. Otherwise, EPA's ISCST model which is the predecessor to AERMOD and no longer preferred would have been used because the observational meteorological data files available from MDAQMD were formatted for ISCST and lacked certain parameters needed to run AERMOD.

Illustrations of the dataset including a wind rose (Figure 4), a wind speed frequency distribution graph (Figure 5), and a flow chart for the meso-scale meteorological (MM5) modeling system (Figure 6) that produced the dataset are presented in Appendix A. Other documentation describing characteristics of the dataset including wind speed frequency tables underlying Figure 4 and Figure 5; and MM5 model settings are presented in Appendix J.

5.4.4 Receptors

Several models with a consistent set of volume sources and varying list of receptors (i.e. discrete, boundary, and grid) were run. The discrete receptor model includes the receptors shown in Table 22 and Figure 7 (Appendix A).

The boundary receptor model run includes only receptors along the boundary around the quarries (Figure 8). The boundary receptor run is used to estimate concentrations of PM_{10} and $PM_{2.5}$ at the point of maximum impact for comparison to primary ambient air quality standards (i.e. to protect human health). The boundary on the north was chosen to coincide with the limits of the national forest as suggested by USFS. The boundary on the south was chosen to reflect the concentration that may be experienced by an individual on the nearest roadway. The boundary on the east was chosen to be half way between the Sentinel Quarry and the neighboring quarry. The boundary on the west was chosen to extend approximately the same distance from the Butterfield Quarry as the boundary on the east extends from the Sentinel Quarry.

Table 22 Nearby Receptors

ID	UTM, Easting (meters)	UTM, Northing (meters)	Type – Location
1	507564	3796038	Boy Scout Ranch – mountains 1.85 miles southeast of B5 Pad
2	504448	3801743	Buddhist Temple – foothills 1.7 miles south of LVPP
3	505532	3803636	Residence – valley 0.5 mile south of LVPP
4	505725	3803616	Residence – valley 0.5 mile south of LVPP
5	505322	3802524	Residence – valley 1.2 miles south of LVPP
6	504060	3801770	Residence – foothills 1.8 miles south-southwest of LVPP
7	504222	3801955	Residence – foothills 1.7 miles south-southwest of LVPP
8	503804	3802143	Residence – foothills 1.7 miles south-southwest of LVPP
9	503942	3802456	Residence – foothills 1.5 miles southwest of LVPP
10	503842	3802821	Residence – foothills 1.3 miles southwest of LVPP

Grid receptor model runs were used in the health risk assessment and the deposition model to generate contoured plots of the results. Grid results were used only for illustration purposes with exception of the deposition impact on vegetation. Due to the nature of the sources which release near the ground (i.e., as compared to a source with a tall stack such as a power plant), the concentration of pollutants decreases with distance from the source and, in fact, may follow the terrain as discussed in relation to the use of the FLAT option above. In cases like this, the point of compliance for AAQS evaluation will be on the project boundary. Receptors located along the project boundary are spaced 50 meters apart which should be acceptable for a site of this size and where the primary sources are mobile (i.e., unlikely to cause a hot spot). Illustrations of contours for pollutants affecting health risk use a grid with 200 meter spacing (Figure 9). The deposition model was prepared to inform the biological impacts of the dust landing on the carbonaceous plants (i.e., as opposed to remaining in air and impacting human health). Areas of carbonaceous plant species span great distances and occur intermittently. Thus, 500 meter grid spacing was used to estimate deposition on the plants and that information was transmitted to the biological consultant (Figure 10).

The deposition model is the only model run that assumes the plume is depleted by deposition. The deposition model considers three sizes of particulates. TSP (i.e. PM_{30}), PM_{10}, and $PM_{2.5}$ are calculated for each source and the amount of each size varies based on the source type accordingly. For instance, the dominant source of dust emissions is the roads which emit a combination of dust and diesel particulate matter. When dust and diesel PM emissions are combined the resulting fractionation for unpaved roadway particulates is 3.34% $PM_{2.5}$; 25.5% $PM_{10-2.5}$; and 71.2% PM_{30-10}. The combination of sources operating at the LVPP results in fractionation of 4.5% $PM_{2.5}$; 14.0% $PM_{10-2.5}$; and 81.5% PM_{30-10}. Other source fractionations were varied according to the calculated amounts of dust and diesel PM.

Table 23 Deposition Parameters

Particle Size Bin (µm)	Assumed Density (grams/cubic centimeter)
2.5	1.0
2.5 - 10 µm	1.75
10 - 30 µm	2.5

Note: Source*: http://www.arb.ca.gov/research/ltads/ltads-ws/4-dust.pdf*.

The weight of particles presented in Table 23 is most appropriate for dust particles which constitute the majority of particulate matter emitted by project sources. Because the diesel particulates are emitted in smaller quantities, the dust densities are applied to all particulates regardless of their origin.

5.5 Health Risk Assessment

Constituents in diesel exhaust and dust emissions were speciated into toxic components using the following CARB Speciation Profiles:

- Particulate matter from unpaved roads (PM Profile #470);
- Particulate matter from paved roads (PM Profile #471);
- Particulate matter from aggregate processing (PM Profile #90013);
- Diesel particulate matter (PM Profile #6139 for the 2013 fleet); and
- Diesel total organic gases (Organic Profile #818).

The health risk assessment was performed using a combination of AERMOD dispersion model (version 12345) and HARP2 (version 15180). AERMOD was used to generate plot files containing dispersion coefficients (χ/Q) that were input to the HARP2 Air Dispersion Model and Risk Tool (ADMRT version 15180). To produce the dispersion coefficients, each source in the AERMOD model was assigned the unit rate emissions factor of one gram per second (1.0 g/s). Values in the resulting plot files were then multiplied by emissions rates for each source to determine the ground level concentration (GLC, in units $\mu g/m^3$) of each pollutant at each receptor location. Appendix J contains a TAC emissions summary table for the Project and Appendix L is a CDROM containing the modeling files.

Peak hour and annual average GLCs calculated by HARP2 were then used for health risk assessment in HARP2. Non-cancer (acute and chronic) and cancer health risks were calculated for individual resident receptors and for worker receptors. Population-wide cancer risk was not calculated due to the remote location of the Project site and results of the individual modeling presented below.

5.5.1 Inhalation Pathway

Non-cancer health risks were determined in HARP2 by dividing the GLC of each pollutant at each receptor by the corresponding reference exposure level (REL, units of $\mu g/m^3$) resulting a hazard index (HI). The HIs for pollutants affecting each target organ were then summed to determine the total HI for each target organ. The target organ with the greatest HI is reported as the non-cancer health risk at each receptor. Worker chronic non-cancer health risk results were multiplied by a Worker Adjustment Factor (WAF) of 4.2 which represents the amount overlap between the Project operating schedule and the worker's work schedule; both of which are assumed to be 8 hr/day, 5 days/wk.

For cancer risk, exposure to individuals was evaluated in HARP2 by calculating the daily dose of each pollutant in milligrams per kilogram body weight per day (mg/kg/d). HARP2 algorithms were used to calculate dose for exposure through inhalation, dermal absorption, ingestion, and mother's milk pathways. Other pathways that are available include drinking water, fish consumption, home grown produce, beef/dairy, and pig/chicken/egg and were not used due to lack of available input parameters and observed characteristics of the residences near the Project site (i.e., no farms or lakes in the vicinity). Although the emissions sources of particulates are controlled, deposition of particles onto the skin, soil, and other media was assumed to occur at the uncontrolled rate of 0.05 meters per second (m/s) because the results were observed to be greater than when the controlled rate of 0.02 m/s was used.

HARP2 contains average and high-end point estimates and data distributions for adults and children for each exposure pathway. The point estimates and data distributions that were used in the HRA fall within the age bins of 3rd trimester to birth, birth to two years of age (0<2), two years through 16 years of age (2<16) and 16 years through 30 years of age (16<30; adult). Table 24 presents the mean and high end point estimates for residential intake rates that were assumed in the HRA.

Table 24 Point Estimates of Residential Daily Breathing Rates by Age Group

Estimate	3rd Trimester[1] (L/kg BW-day)[2]	0<2 Years (L/kg BW-day)	2<16 Years (L/kg BW-day)	16<30 Years (L/kg BW-day)
Mean (65%ile)[3]	225	658	452	210
High-End (95%ile)	361	1090	745	335

Source: HRA Guidelines (p. 5-25).

1 3rd trimester breathing rates based on breathing rate of pregnant women using the assumption that the dose to the fetus during the 3rd trimester is the same as that to the mother.

2 Values are in units of liters of air per kilogram of body weight per day.

3 Mean values were not used in the HRA and are provided for informational purposes only.

As recommended in the HRA Guidelines, workers were assumed to be between the ages 16 and 70 (16<70) and performing moderate intensity activities. The mean and high-end intake rates for workers were 170 and 230 liters per kilogram per 8-hours (L/kg-8-hrs). Workers were assumed to be exposed for 25 years as recommended in the HRA Guidelines (p. 5-26).

Annual residential dose was calculated by HARP2 using the GLC (mg/m^3), the intake rate (L/kg-day), 365 days/yr exposure frequency, and an assumption that the entire mass of pollutants inhaled is absorbed into the body of the individual exposed (i.e., no pollutants are exhaled). A fraction of time at home (FAH) of 73% was applied for individuals 16 years and older but could have been applied from the 3rd trimester to age two (85%) and from two to 16 years (72%) because there is likely no school within the 1 in 1 million cancer risk contour (p. 8-5 HRA Guidelines). Annual worker dose was calculated the same way and adjusted to 250 days/yr exposure frequency by multiplying the result by 0.68.

Inhalation dose of each pollutant at each receptor for each year was then multiplied in HARP2 by the inhalation cancer slope factor for the pollutant to estimate annual cancer risk in units of excess cancer cases per million individuals exposed. The total cancer risk from inhalation was then calculated by summing the annual risk from each pollutant and year of exposure. Residential cancer risk assumed exposure duration of 30 years as recommended by OEHHA in the HRA Guidelines (p. 8-1) and the OEHHA Derived Method intake rate for all exposure pathways and all ages which is more conservative than the recommended Risk Management Policy (RMP) (95/80%ile combination for inhalation pathway and 65%ile for other pathways), and RMP Derived Method (95/80%ile combination for two dominant exposure pathways and 65%ile for other pathways). The RMP 95/80%ile combination refers to applying the 95th percentile intake rate for ages less than two years and the 80th percentile intake rate for ages over two years whereas the OEHHA Derived Method uses 95%ile intake rate for all ages and results in greater risk estimates which is conservative.

5.5.2 Ingestion Pathway

The average concentration of pollutants in soil is a function of the deposition, accumulation period, chemical specific half-life, mixing depth, and soil bulk density. For simplicity and health protection, the

HARP2 default 70-year soil deposition for the accumulation period was assumed. As discussed above, the uncontrolled deposition rate (0.05 m/s) was applied, which is conservative. Equations and parameters used to estimate the concentration of pollutant in the soil from the GLC can be found in the HRA Guidelines (p. 5-6 to 5-8).

The exposure dose through residential soil ingestion varies by age and was calculated for each age group. The dose is calculated by HARP2 based on the concentration in soil, pollutant specific gastrointestinal relative absorption fraction (GRAF, unitless), soil ingestion rate (mg/kg-day), and exposure frequency using the equation presented in the HRA Guidelines (p. 5-43). For simplicity, GRAF was assigned a value of one which represents the entire mass of pollutant being absorbed. Soil ingestion rates vary by age and the high-end point estimates shown in Table 25 were used.

Table 25 Soil Ingestion Rate Point Estimates by Age Group

Estimate	3rd Trimester[1] (mg/kg BW-yr)[2]	0<2 Years (mg/kg BW-yr)	2<16 Years (mg/kg BW-yr)	16<30 Years (mg/kg BW-yr)
Mean (65%ile)[3]	0.7	20	3	0.7
High-End (95%ile)	3	40	10	3

Source: HRA Guidelines (p. 5-44).
1 3rd trimester is assumed to be the mother's soil ingestion rate.
2 Values are in units of milligrams of pollutant ingested per kilogram of body weight per year.
3 Geometric mean (GM) values were not used in the HRA and are provided for informational purposes only.

5.5.3 Dermal Pathway

Exposure through dermal absorption (dose-dermal) is a function of the soil or dust loading of the exposed skin surface, the amount of skin surface area exposed, and the concentration and availability of the pollutant. The annual dermal load (ADL) is a composite of the body surface area per kg body weight, exposure frequency, and soil adherence to the skin. High-end point estimates of ADL for individuals located in a mixed climate were used.

Table 26 Annual Dermal Loading Point Estimates by Age Group

Estimate	3rd Trimester[1] (mg/kg BW-yr)[2]	0<2 Years (mg/kg BW-yr)	2<16 Years (mg/kg BW-yr)	16<30 Years (mg/kg BW-yr)
Mean (65%ile)[3]	1,100	2,200	5,700	1,100
High-End (95%ile)	2,400	2,900	8,100	2,400

Source: HRA Guidelines (p. 5-37).
1 3rd trimester based on ADL of mother normalized to body weight assuming exposure to the mother and feus are the same.
2 Values are in units of milligrams of pollutant on skin per kilogram of body weight per year.
3 Mean values were not used in the HRA and are provided for informational purposes only.

High-end ADL was combined with the concentration of pollutant in soil (see Section 5.5.2), the fraction absorbed across skin (pollutant-specific factor), the exposure duration (i.e., 30 years) and the averaging time (i.e., 70 year lifetime) using equations presented in the HRA Guidelines (p. 5-41) to estimate the dermal dose for each residential receptor. Worker receptors used the adult ADL and omitted exposure duration and averaging time from the calculation.

5.5.4 Mother's Milk Pathway

Estimates of the concentration of pollutants in a mother's milk require the use of the air, water, and soil environmental fate evaluations. Infants would be exposed to the pollutants in concentrations equal to the concentrations at which the mother is exposed from birth up to 25 years of age when the infant is born. The exposed infant is assumed to be fully breastfed for the first year of life. The summed average dose daily dose (mg/kg-day) from all pathways is calculated for the nursing mother using equations in the HRA Guidelines (p. 5-59). Breast milk intake rates of 101 and 139 g/kg-day are used by HARP2.

6.0 PROJECT IMPACTS

The Project does not propose to construct any structures other than excavations and piles which are created from mining operations. Thus, only operation phase is assessed (Appendix I).

- Regional air quality impacts are assessed in Section 6.1 by comparison to the MDAQMD mass-based significance criteria.
- Localized criteria pollutant impacts are assessed in Section 6.2 by comparison to Significant Impact Levels (SILs) because the region is in non-attainment for pollutants modeled (i.e., PM_{10}, $PM_{2.5}$).
- Federal conformity is assessed based on federal regulations (i.e., 40CFR93) and MDAQMD Rule 2002 which mirrors the federal regulation as discussed in Sections 3.2 and 4.1.
- Impacts on Class I Wilderness Areas are assessed in Section 6.4 using Air Quality Related Values as discussed in Section 3.3.
- Health risk is not discussed in this section because the assessment included the effects of proposed mitigation measures which are discussed in the next section, Section 7.0.
- Greenhouse gas emissions impacts are assessed using the MDAQMD significance criteria in Section 6.5.

6.1 Regional Air Quality Impacts

Project emissions are compared to the mass-based significance criteria from the MDAQMD CEQA Handbook in Table 27.

Table 27 Project Emissions and Significance Determination

	Project Increment (tpy)	Significance Criteria (tpy)	Significant?
VOC	1.27	25	No
NOx	23.9	25	No
CO	12.0	100	No
SOx	0.0038	25	No
TSP	118	n/a	No
PM_{10}	34.3	15	Yes
$PM_{2.5}$	2.38	15	No
CO_2e	4,951	100,000	No
H_2S	ND	10	No
Pb	0.012	0.6	No

Notes: ND = Not Determined; n/a = not applicable; tpy = tons per year.

As shown in Table 27, the increment in emissions exceeds the mass-based threshold for PM_{10}. Other pollutant emissions are less than the significance criteria and will not result in a significant impact on regional air quality.

6.2 Localized Criteria Pollutant Impacts

A project will have a "potentially significant impact" on air quality if it "violates any air quality standard or contributes substantially to an existing or projected air quality violation." Project emissions have the potential to create localized "hot spots" if, when summed with existing ambient concentrations, they result in concentrations greater than the applicable AAQS. The main criteria pollutants of concern for the Project are TSPs (used for deposition modeling), PM_{10}, and $PM_{2.5}$. Ambient air quality standards for pollutants that are less of a concern are discussed first followed by modeling results for the criteria pollutants of concern.

As discussed in the EPA Modeling Guidelines (40 CFR Part 51, Appendix W), CO AAQS exceedence is generally a concern at high volume vehicular intersections in urban areas that operate at level of service (LOS) D or worse and where CO is emitted into partially or completely enclosed spaces such as parking structures and garages. The Guidelines state the following regarding CO models:

> "5.1.a. This section identifies modeling approaches or models appropriate for addressing ozone (O3) a, carbon monoxide (CO), nitrogen dioxide (NO_2), particulates (PM–2.5 and PM–10), and lead. These pollutants are often associated with emissions from numerous sources. Generally, mobile sources contribute significantly to emissions of these pollutants or their precursors. For cases where it is of interest to estimate concentrations of CO or NO_2 near a single or small group of stationary sources, refer to Section 4. (Modeling approaches for SO_2 are discussed in Section 4.)
>
> 5.1.i. Models for assessing the impact of CO emissions are needed for a number of different purposes. Examples include evaluating effects of point sources, congested intersections and highways, as well as the cumulative effect of numerous sources of CO in an urban area.

This Project has no stationary combustion sources, is not in an urban area, and would not change the number of vehicles on a public road. Moreover, the maximum possible increase in CO emissions is 12 ton/yr which is much less than the PSD screening threshold of 250 ton/yr for a single source above which CO modeling is required. Finally, even if the Project was responsible for an increasing the concentration of CO by an amount relative to the increase in emissions over the existing emissions (i.e., 40% as shown in Table 16, existing concentrations and applicable AAQS are in Table 1 and Table 2), the result would still not exceed the AAQS. For these reasons, modeling for CO is unwarranted for the Project and the impact on CO AAQS is considered less than significant.

SO_2 AAQS exceedences are normally a concern for industrial facilities and specifically those that burn coal or refine petroleum. In fact, the EPA Guidelines recommend all modeling for SO_2 be performed using methods applicable to stationary sources (i.e., AERMOD). The maximum possible increase in SO_2 emissions is 0.0038 ton/yr which is much less than the PSD screening threshold of 40 ton/yr for a single source above which SO_2 modeling is warranted. Moreover, California has regulations that affect each in-use diesel engine on-site and the fuel burned in those engines. In-use requirements are implemented on a fleetwide basis and require all engines to be replaced or retrofit with diesel particulate filters. In California, diesel fuel is required to be ultra-low sulfur which has less than 15 ppmw sulfur as compared to EPA standards which require less than 2,000 ppmw sulfur. Finally, even if the Project was responsible for an increasing the concentration of SO_2 by an amount relative to the increase in emissions over the existing emissions (i.e., 40% as shown in Table 16, existing concentrations and applicable AAQS are in Table 1 and Table 2), the result would still not exceed the AAQS. For these reasons, SO_2 modeling is unwarranted for the Project and the impact on SO_2 AAQS is considered less than significant.

NO_2 AAQS exceedences are normally a concern for facilities with a large combustion source. The quarrying and transportation of materials is performed by diesel engines which are a source of NO_2. However, the diesel vehicles are comparatively small emitters of NO_2 and they move in order to perform job tasks. Movement reduces the likelihood of a hot spot. NO_2 has annual and hourly AAQS.

On an annual basis, the Project would result in an increase in NOx emissions that is less than the mass-based MDAQMD CEQA Significance Criteria. Therefore, modeling to determine annual NO_2 concentration for comparison to the AAQS is not warranted.

On an hourly basis, the Project may increase NOx hourly potential to emit by adding up to four offroad engines. Specifically, two offroad haul trucks, one loader/excavator, and one mobile crusher/screening system or surface miner. The potential for the Project to cause or contribute to an exceedence of the hourly NO_2 AAQS is unlikely given the size of the operational area (214.8 acres), distance from the quarries where activity is expected to be most intense to the Project boundary, and the limited potential increase in hourly activity at any one location on-site. Therefore, modeling hourly NO_2 concentrations is not warranted for the Project and the impact on NO_2 AAQS is considered less than significant.

Emissions of the criteria pollutants of concern for the Project (i.e., PM_{10} and $PM_{2.5}$) are modeled to predict concentrations at the off-site point of maximum impact (PMI). For Project sources that are close to the ground relative to the distance to the boundary, the PMIs are predicted at the property boundary. Table 28 shows impact assessment results for the PM_{10} and $PM_{2.5}$ air dispersion models that were prepared.

Table 28 PM_{10} and $PM_{2.5}$ Concentrations at Point of Maximum Impact and Significance Determination

(all values in units µg/m³)	PM_{10}-24hr	PM_{10}-Annual	$PM_{2.5}$-24hr	$PM_{2.5}$-Annual
Increment	14.4	3.07	3.0	0.37
Background	160.2	18.5	35.1	9.7
Cumulative Concentration	174.6	21.57	38.1	10.07
Most Stringent AAQS	50	20	12	35
SIL	10.4	2.08	2.5	0.63
Exceeds AAQS?	No	No	No	No
Exceeds SIL?	Yes	Yes	Yes	No

Note: PMI for the 24-hr concentrations occurs at 506637.17, 3798752.79 which is located east of Sentinel Quarry. Annual concentration PMI occurs at 505406.72, 3801304.61 which is where the Project boundary crosses Crystal Creek Road.

Results of criteria pollutant modeling show that the Project alone would not exceed the most stringent AAQS but would increase pollutants concentrations above the both 24-hour SILs and the SIL for annual PM_{10}. The SILs represent the amount that is cumulatively considerable and are applied as the significance thresholds. The exceedences are because of road dust and bulldozing/grading each of which is likely overestimated by the MDAQMD and US EPA AP-42 calculation methodologies. Nevertheless, mitigations and alternatives are assessed later in this report that will reduce the impacts shown in Table 28.

Deposition of dust occurs onto plants surrounding the quarries and specifically areas called out for conservation in the Carbonate Plant Habitat Management Strategy. Deposition outside the operational areas of the quarries is on the order of 1.0 gram per square meter per year (g/m^2-yr). This modeling was performed in order to disclose this impact so that it could be considered as an impact on Class II Wilderness Areas that surround the quarries (i.e. Class II areas are all areas in the National Forest that are not Class I).

6.3 Federal Conformity

As discussed in Section 3.1, federal conformity analysis is not required provided that:

- NOx and VOC emissions are less than 25 tons per year each;
- PM_{10} emissions are less than 100 tons per year; and
- Emissions are less than 10% of the non-attainment area emissions inventory.

As shown in Table 27, the Project emits 1.27 tons per year of VOC (i.e. ROG) and 23.9 tons per year of NOx. Thus, VOC and NOx emissions are each less than the screening threshold. PM_{10} emissions are 34.3 tons per year which is also less than the applicable screening threshold.

In 2010, sources within San Bernardino portion of the Mojave Desert Air Basin (CARB 2009 Almanac) emitted NOx and PM_{10} in the amounts of 55,125 tons per year and 43,646 tons per year, respectively. The Project increment represents 0.043% of the NOx emissions and 0.055% of the PM_{10} emissions in the region. The standard is to evaluate the emissions inventory within the non-attainment area. However, those emissions were not readily available. The Project may represent a somewhat higher percentage of the total emissions within the Western Mojave Desert Ozone Non-Attainment Area and/or the "portion of MDAQMD outside of Southeast Desert Modified AQMA." However, is unlikely that the emissions would exceed 10% in any case.

6.4 Class I Wilderness Area Impacts

The Federal Land Managers' AQRVs apply to new or modified major sources and are generally used for PSD permitting under the Clean Air Act. The Project does not propose a new stationary major source or a modified stationary major source that would require a permit under the Clean Air Act. Fugitive area source emissions and vehicular emissions are excluded from determining whether the quarry is a major source (i.e., only emissions from stationary sources are counted). The Omya facility is not considered a major source as evidenced by the fact that it holds local district operating permits rather than a federal operating permit under Title V of the Clean Air Act (i.e., as required by the implementing regulations in 40 CFR Part 70). The Project would modify the Sentinel and Butterfield Quarries by increasing the production rate. A major modification which would trigger review of AQRVs would have a significant emissions increase defined as exceeding the values from 40 CFR Section 52.21(b)(23) shown in Table 29.

Table 29 Comparison of Project Emissions with Major Modification Thresholds

Pollutant	Major Modification Significant Increase (ton/yr)	Project Increase (ton/yr)	Mitigated Project Increase (ton/yr)
CO	100	12	12
NO_X	40	23.9	15.3
SO_X	40	0.0038	0.0038
PM	25	118	23
PM_{10}	15	34.3	2.1
$PM_{2.5}$	10	2.38	-3.39
H2S	10	ND	ND
Pb	0.6	0.012	0.012

As shown in Table 29, even when fugitive and mobile sources are included in the comparison, the increased emissions from sources operated by Omya do not exceed major modification thresholds and would therefore not be evaluated under the Prevention of Significant Deterioration (PSD) program. By not triggering PSD, the increase in emissions would also not be required to assess the AQRVs. Nevertheless, US Forest Service staff has required evaluation of potential impacts on AQRVs for this Project.

The FLAG report provides an equation (Quantity/Distance < 10; or Q/D < 10) by which projects may screen out of detailed analyses for impacts to AQRVs. Application of the equation is limited to projects that are located more than 50 km from a Class I Wilderness Area. This Project is located 18 km from the San Gorgonio Wilderness Area and may not use the Q/D approach.

Project sources are fugitive and mobile such that a coherent plume is physically impossible. Moreover, Figure 23, which shows the intervening terrain between the Project site and the San Gorgonio Wilderness Area is such that there is little possibility that an observer of one could see the other. As shown in Table 29, were this Project a single stationary source seeking an air quality operating permit, no analysis of AQRVs would be necessary.

Monitoring performed in the San Gorgonio Wilderness Area indicates that nitrates, organic matter, and sulfates have the strongest contributions to degrading visibility on worst days (Appendix D). The concentrations of these pollutants are the result of regional emissions and particularly emissions from the South Coast Air Basin to the west. The Project emits NOx, some of which may become nitrates but the relative amount as compared to the entire South Coast Air Basin is de minimis. The Project also emits particulate matter but the worst days are relatively unaffected by particulates. Thus, the Project is unlikely to emit pollutants in amounts that would affect visibility in the San Gorgonio and other nearby Class I Wilderness Areas. Nevertheless, visibility impact analysis was performed (Appendix N) using the Major Modification thresholds that are shown to be greater than Project emissions increase in Table 29. Based on the visibility analysis presented in Appendix N, even if the Project were to emit greater amounts of pollutants up to the Major Modification thresholds, the impact on visibility would be less than significant.

Phytotoxic ozone concentrations may result where the plume from a large combustion source travels relatively intact a sufficient distance for the photo-chemical reaction between NOx, reactive organics, and sunlight to have occurred and produced ozone. The ozone would then be concentrated at a hot spot where vegetation could be affected. The Project sources of NOx are small and distributed over a large area. Therefore, it is unlikely that the Project would cause phytotoxic ozone concentrations.

The deposition AQRV is concerned with the acidification of water bodies. Specifically, sulfur and nitrogen compounds cause sensitive freshwater lakes and streams to lose acid-neutralizing capacity and sensitive soils to become acidified. Other ecosystems, including the forest, may exhibit fertilization and other effects from excess nitrogen deposition. The Project sources of nitrogen and sulfur are small and distributed over a large area. Therefore, it is unlikely that the Project would cause acidification and the Project impact for this AQRV is considered less than significant.

In summary, as discussed above and analyzed in Appendix N, the Project would have a less than significant effect on each of the ARQVs.

6.5 Greenhouse Gas Emissions Impact

GHG emissions would be 4,951 tons/yr of CO_2e (Appendix I) which is less than the MDAQMD criteria of 100,000 tons/yr. As discussed in Section 3.5.3, the County GHG Plan does not apply to the Project, because it is a stationary source and located on National Forest land. Thus, the 3,000 $MTCO_2e$/yr screening criteria is not used. Even if the County screening criteria were used, the performance standards that would then be required could not be implemented because the Project does not involve the construction of buildings or additional employees traveling to the site.

7.0 PROPOSED MITIGATIONS AND RESIDUAL IMPACTS

The Project would result in significant PM_{10} emissions and concentrations. The following mitigations are recommended to reduce impacts to less than significant levels:

Mitigation Measure AQ-1: Unpaved roads shall be controlled by at least 80% using methods that are consistent with MDAQMD guidance.

Mitigation Measure AQ-2: Areas to be graded and where bulldozer operates shall controlled by at least 85% using methods that are consistent with MDAQMD guidance.

7.1 Mitigated Mass-Based Criteria Pollutant Impacts

Table 30 presents the mitigated increment in emissions (Appendix J: Meteorological Data Used in Modeling

Appendix K) and compares the increment to significance thresholds. As shown in Table 30, Mitigation Measures AQ-1 through AQ-2 reduce Project emissions to less than the MDAQMD significance thresholds.

Table 30 Mitigated Emissions Comparisons

	Mitigated Increment (tpy)	Significance Threshold (tpy)	Significant?
VOC	1.27	25	No
NOx	23.9	25	No
CO	12.0	100	No
SOx	0.0038	25	No
TSP	23	n/a	No
PM_{10}	2.1	15	No
$PM_{2.5}$	-3.39	15	No
H_2S	ND	10	No
Pb	0.012	0.6	No

Note: ND = Not Determined; n/a = not applicable; tpy = tons per year.

Localized concentrations are also mitigated to less than significant levels by AQ-1 and AQ-2. Modeling results showing mitigated emissions impacts are shown in Table 31. Although cumulative concentration exceeds AAQS, the project effect would be de minimis because it does not exceed the SIL.

Table 31 Mitigated PM_{10} and $PM_{2.5}$ Concentrations at PMI and Significance Determination

(all values in units μg/m³)	PM_{10}-24hr	PM_{10}-Annual	$PM_{2.5}$-24hr	$PM_{2.5}$-Annual
Increment	7.9	1.72	1.54	0.23
Background	160.2	18.5	35.1	9.7
Cumulative Concentration	168.1	20.27	36.64	9.93
Most Stringent AAQS	50	20	12	35
SIL	10.4	2.08	2.5	0.63
Exceeds AAQS?	No	No	No	No
Exceeds SIL?	No	No	No	No

Note: PMI for the 24-hr concentrations occurs at 505493.47, 3797728.78 which is located south of the B5 Pad. Annual concentration PMI occurs at 505406.72, 3801304.61 which is where the Project boundary crosses Crystal Creek Road.

7.2 Health Risk Impacts

TACs emitted from project operation consist mainly of those found in vehicle exhaust and, to a lesser extent, trace amounts of metals and silica found fugitive dust. Table 32 presents health risk predicted at nearby receptors. As shown in Table 32, health risk impacts from the Project are less than significant. Figure 13 through Figure 17 (Appendix A) present contoured plots of health risk for the Project.

Table 32 Health Risk Impacts and Significance Determination

Receptor ID	Cancer Risk*	Chronic Non-Cancer Risk (H.I.)*	Acute Non-Cancer Risk (H.I.)*	Significant?
R1	2.52	0.042	0.098	No
R2	8.41	0.086	0.093	No
R3	5.82	0.055	0.036	No
R4	4.51	0.046	0.033	No
R5	9.67	0.087	0.068	No
R6	5.69	0.064	0.078	No
R7	6.32	0.066	0.073	No
R8	4.00	0.044	0.048	No
R9	3.96	0.042	0.037	No
R10	2.91	0.031	0.014	No

*Values represent excess cancer cases per million people exposed and hazard index (H.I.).

8.0 ALTERNATIVES

Reasonable alternatives were developed that respond to the significant issues, reduce potential environmental impacts and address the purpose of and need for action and project objectives. Alternatives that did not meet the purpose of and need for action, did not resolve environmental conflicts and/or were not available or feasible were eliminated from detailed consideration

The Forest Supervisor and County identified the following four alternatives for detailed analysis in this DEIR/EIS, each of which is summarized below, followed by the detailed analysis.

8.1 Alternative 1: No Action/Mining under Current Entitlements

Under this alternative, Omya would not expand the Butterfield - Sentinel Quarries. The existing permitted mining activities located on approximately 137 acres within the 954 acres of unpatented placer claims controlled by Omya would continue in accordance with the approved POO and Reclamation Plans and other Federal, State and local regulations.

Cancer risk which would be less than for the Project due to the shortened life of the resource and exposure duration. The additional equipment described in Table 5 of the Amended Plan of Operations (June 2013) would presumably not be added under this alternative. Nevertheless, existing entitlements would allow the project maximum of 680,000 tons to be produced from the Sentinel and Butterfield quarries exclusively. Aside from the minor differences in the number and/or type of equipment and the slightly reduced cancer risk, the air quality impacts of the No Action alternative are the same as the Project alternative.

8.2 Alternative 2: Proposed Project

This alternative is the Proposed Project. It reflects the activities identified in the Amended POO and Reclamation Plan submitted to the Forest Service and the Mining and Reclamation Plan CUP submitted to the County. The potential impacts to air quality for Alternative 2 are discussed in Sections 6.0 and 7.0 of this AQIA.

8.3 Alternative 3: Partial Implementation – Butterfield Quarry Expansion Only

Alternative 3 would allow for only the expansion of the Butterfield Quarry. The Sentinel Quarry would continue to be mined under its current permit approved in 2003. In this alternative the Butterfield Quarry would have a shorter duration of 20 years through year 2035 instead of 40 years as proposed in Alternative 2. It would also have a smaller footprint than Alternative 2 by approximately 50 acres.

This alternative would have similar differences from the Project as the No Action alternative described above. Specifically, cancer risk would be less than for the Project due to the shortened life of the resource and exposure duration.

8.4 Alternative 4: Combined Production with the White Knob Quarry

Historically the limestone ore provided to the LVPP has been approximately a 60/40 ratio between the Butterfield and Sentinel Quarries and the White Knob Quarry. This alternative would assume that instead of the Butterfield and Sentinel Quarries providing 100% (680,000 tpy) of the ore to the LVPP, a range of more realistic production mixes between the quarries would be evaluated.

This alternative would be more likely than the Project alternative and will result in less difference from the existing setting. This alternative was determined by adjusting the ratio of quarry production until the PM_{10} emissions were less than the significance threshold (Appendix L). Butterfield and Sentinel can process 77% of the ore without exceeding the significance thresholds in Table 33.

Table 33 Alternative 4 Emissions Comparison (77% from Butterfield and Sentinel Quarries)

	Project Increment (tpy)	Significance Threshold (tpy)	Significant?
VOC	0.77	25	No
NOx	15.3	25	No
CO	6.2	100	No
SOx	0.0035	25	No
TSP	60	n/a	No
PM_{10}	14.9	15	No
$PM_{2.5}$	-1.58	15	No
CO_2e	3,515	100,000	No
H_2S	ND	10	No
Pb	-0.011	0.6	No

Notes: ND = Not Determined; n/a = not applicable; tpy = tons per year.

Table 34 presents predicted concentrations for Alternative 4. Alternative 4 is significant for the 24-hour PM_{10} standard and cumulative considerable when compared to PM_{10} annual and $PM_{2.5}$ 24-hour standards.

Table 34 Alternative 4 Concentration at Point of Maximum Impact

(all values in units µg/m³)	PM_{10}-24hr	PM_{10}-Annual	$PM_{2.5}$-24hr	$PM_{2.5}$-Annual
Increment	10.9	1.50	2.1	0.18
Background	160.2	18.5	35.1	9.7
Cumulative Concentration	171.1	20.0	37.2	9.88
Most Stringent AAQS	50	20	12	35
SIL	10.4	2.08	2.5	0.63
Exceeds AAQS?	No	No	No	No
Exceeds SIL?	Yes	No	No	No

Note: Daily PMI for PM_{10} occurs at 505533.04, 3797727.34 which is located south of the B5 Pad and daily PMI for $PM_{2.5}$ occurs at 506637.17, 3798752.79 which is located east of Sentinel Quarry. Annual concentration PMI occurs at 505406.72, 3801304.61 which is where the Project boundary crosses Crystal Creek Road.

Table 35 presents health risk results for Alternative 4. The results indicate that Alternative 4 will result in less than significant impacts on health risk. Figure 18 through Figure 22 (Appendix A) show contoured plots of health risk for Alternative 4.

Table 35 Alternative 4 Health Risk Impacts and Significance Determinations

Receptor ID	Cancer Risk *	Chronic Non-Cancer Risk (H.I.) *	Acute Non-Cancer Risk (H.I.)	Significant?
R1	1.09	0.0064	0.00211	No
R2	3.70	0.0224	0.0019	No
R3	3.47	0.0542	0.0823	No
R4	2.72	0.0447	0.0636	No
R5	4.54	0.0338	0.0187	No
R6	2.45	0.0138	0.0018	No
R7	2.78	0.0167	0.0019	No
R8	1.73	0.0093	0.0014	No
R9	1.76	0.0113	0.0019	No
R10	1.32	0.0099	0.0005	No

*Values represent excess cancer cases per million people exposed and hazard index (H.I.).

As shown in Table 34, Alternative 4 would result in a cumulatively considerable concentration of PM_{10}. Accordingly, Alternative 4 requires mitigation of the impact to less than significant levels or the maximum extent feasible. Alternative 4 Mitigation Measure AQ-1 is applied to reduce concentrations of particulates.

Alt 4 Mitigation Measure AQ-1: Unpaved roads shall be controlled by at least 80% using methods that are consistent with MDAQMD guidance.

Mitigated concentrations of particulates presented in Table 36 are less than the SILs which are applied as the significance threshold.

Table 36 Mitigated Alternative 4 Concentrations at PMI and Significance Determinations

(all values in units µg/m³)	PM_{10}-24hr	PM_{10}-Annual	$PM_{2.5}$-24hr	$PM_{2.5}$-Annual
Increment	8.6	0.57	1.86	0.11
Background	160.2	18.5	35.1	9.7
Cumulative Concentration	168.8	19.07	36.96	9.81
Most Stringent AAQS	50	20	12	35
SIL	10.4	2.08	2.5	0.63
Exceeds AAQS?	No	No	No	No
Exceeds SIL?	No	No	No	No

Note: Daily PMI for PM_{10} occurs at 506638.52, 3798702.95 and daily PMI for $PM_{2.5}$ occurs at 506637.17, 3798752.79; both of which are located east of Sentinel Quarry. Annual concentration PMI occurs at 505406.72, 3801304.61 which is where the Project boundary crosses Crystal Creek Road.

9.0 REFERENCES

AB 32 Scoping Plan, CARB, December 2014.
(http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm).

AB 32 Scoping Plan, updated October 1, 2015
http://www.arb.ca.gov/cc/scopingplan/meetings/10_1_15slides/2015slides.pdf

AERMOD View Version 8.2.0 by Lakes Environmental (AERMOD build number 12345).
(http://www.weblakes.com/products/aermod/index.html)

Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments, California Office of Environmental Health Hazard Assessment (OEHHA) (2015)
(http://www.oehha.org/air/hot_spots/HRAguidefinal.html).

AP-42, US EPA.
(http://www.epa.gov/ttn/chief).

Area Designations Maps, (page last reviewed August 22, 2014)
(http://www.arb.ca.gov/desig/adm/adm.htm)

CalEEMod User Guide Version 2011.1, SCAQMD, February 2011.
(http://www.aqmd.gov/caleemod/guide.htm).

CEQA and Federal Conformity Guidelines, MDAQMD, August 2011.
(http://www.mdaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=2910).

EMFAC2011, CARB.
(http://www.arb.ca.gov/msei/msei.htm).

EPA Memorandum from Tyler Fox, Leader Air Quality Modeling Group C439-01 to Regional Air Division Directors, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard" dated March 1, 2011.
(http://www.epa.gov/region7/air/nsr/nsrmemos/appwno2_2.pdf)

EPA's Endangerment Finding – Health Effects Fact Sheet
(http://www.epa.gov/climatechange/Downloads/endangerment/EndangermentFinding_Health.pdf).

Final Supplement to the AB 32 Scoping Plan Functionally Equivalent Document, CARB, August 24, 2011.
(http://www.arb.ca.gov/cc/scopingplan/document/final_supplement_to_sp_fed.pdf) .

GHG Emissions Development Process Review, San Bernardino County (updated 3/2015).

HARP User Manual, CARB, 8/1/2014
(http://www.arb.ca.gov/toxics/harp/harp.htm).

Hot Spots Analysis and Reporting Program (HARP) Version 1.4f (Build 23.11.01), CARB, May 2012.
(http://www.arb.ca.gov/toxics/harp/harp.htm).

Multiple Air Toxics Exposure Study in the South Coast Air Basin (MATES-II and MATES-III), South Coast Air Quality Management District, March 2000 and September 2008.
(http://www.aqmd.gov/matesiidf/matestoc.htm)
(http://www.aqmd.gov/prdas/matesIII/matesIII.html)

Multiple Air Toxics Exposure Study in the South Coast Air Basin (MATES-IV) Final Report, May 2015.
(http://www.aqmd.gov/home/library/air -quality -data - studies/health -studies/mates -iv)

OFFROAD2011, CARB.
(http://www.arb.ca.gov/msei/msei.htm) .

"Phase I Report – Revised 2010," Federal Land Managers' Air Quality Related Values Work Group (FLAG), October 2010.
(http://www.nature.nps.gov/air/pubs/pdf/flag/FLAG_2010.pdf) .

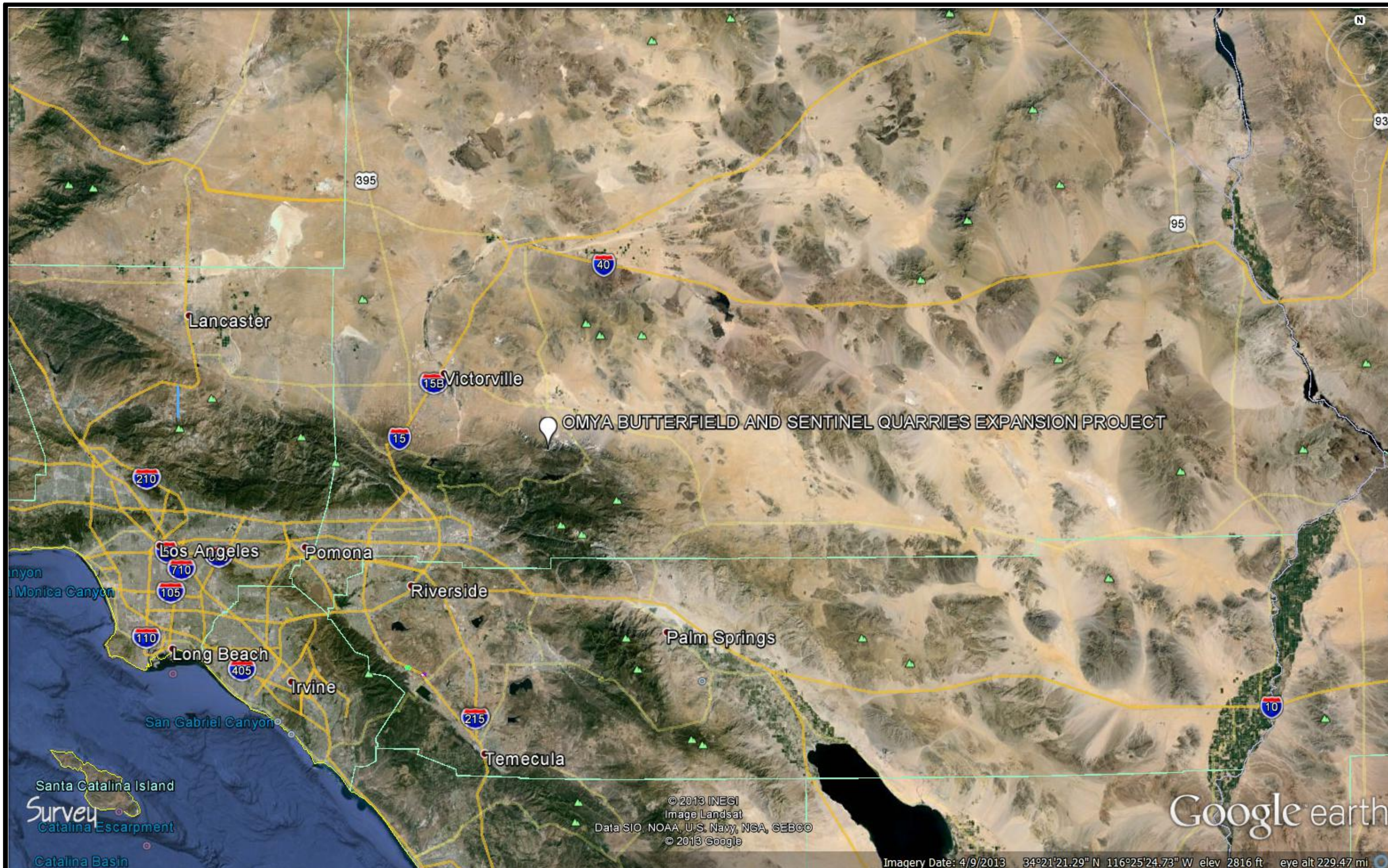
Rules and Regulations of the Mojave Desert Air Quality Management District.
(http://www.mdaqmd.ca.gov/index.aspx?page=138) .

Regulatory Advisory 10-414, CARB, May 2011.
(http://www.arb.ca.gov/enf/advs/advs414.pdf).

State CEQA Guidelines, National Resources Agency, last updated March 18, 2010.
(http://ceres.ca.gov/ceqa/guidelines/).

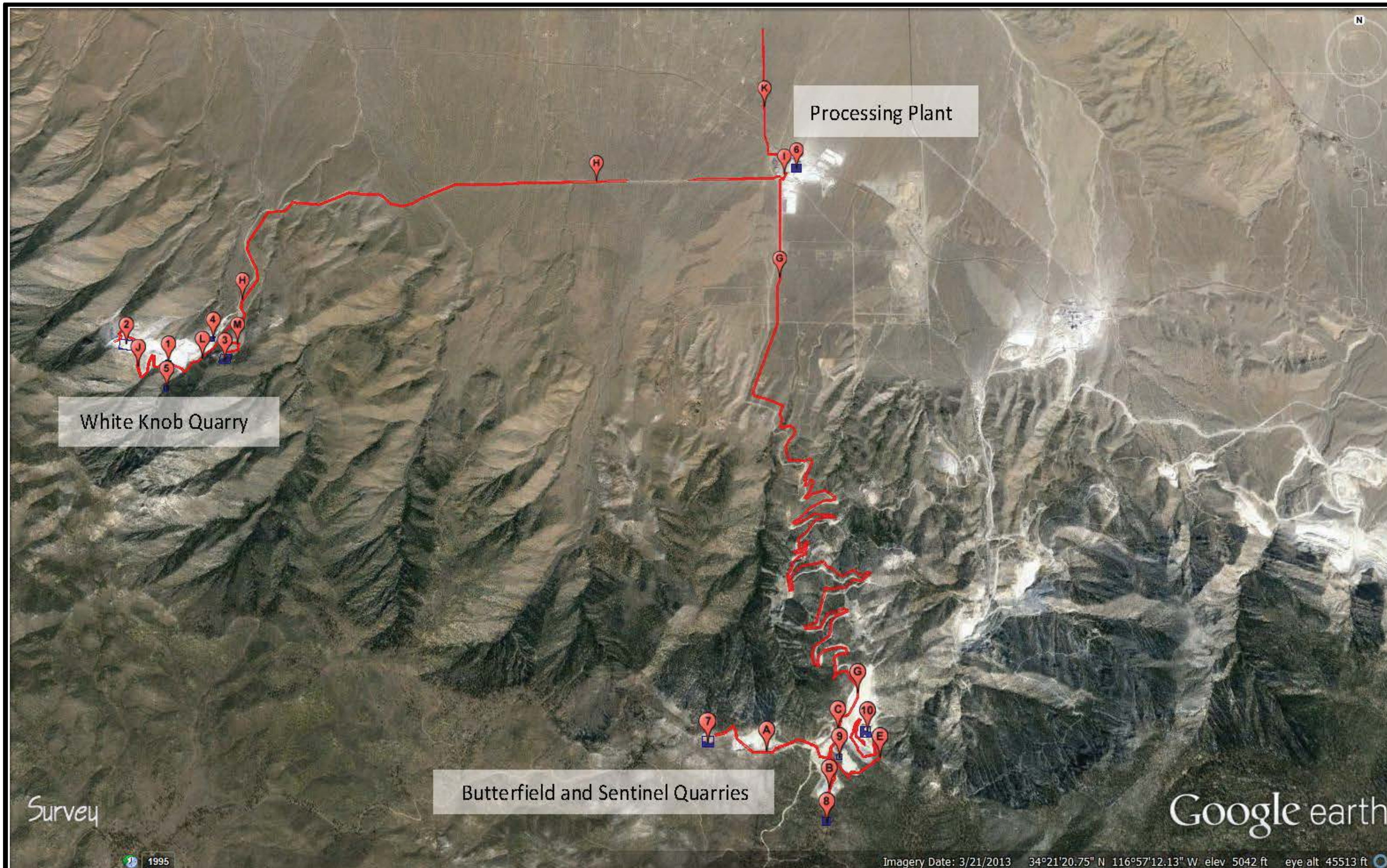
Speciation Profiles Used in ARB Modeling, CARB, December 12, 2012.
(http://www.arb.ca.gov/ei/speciate/speciate.htm).

Appendix A: Figures



SESPE CONSULTING, INC.

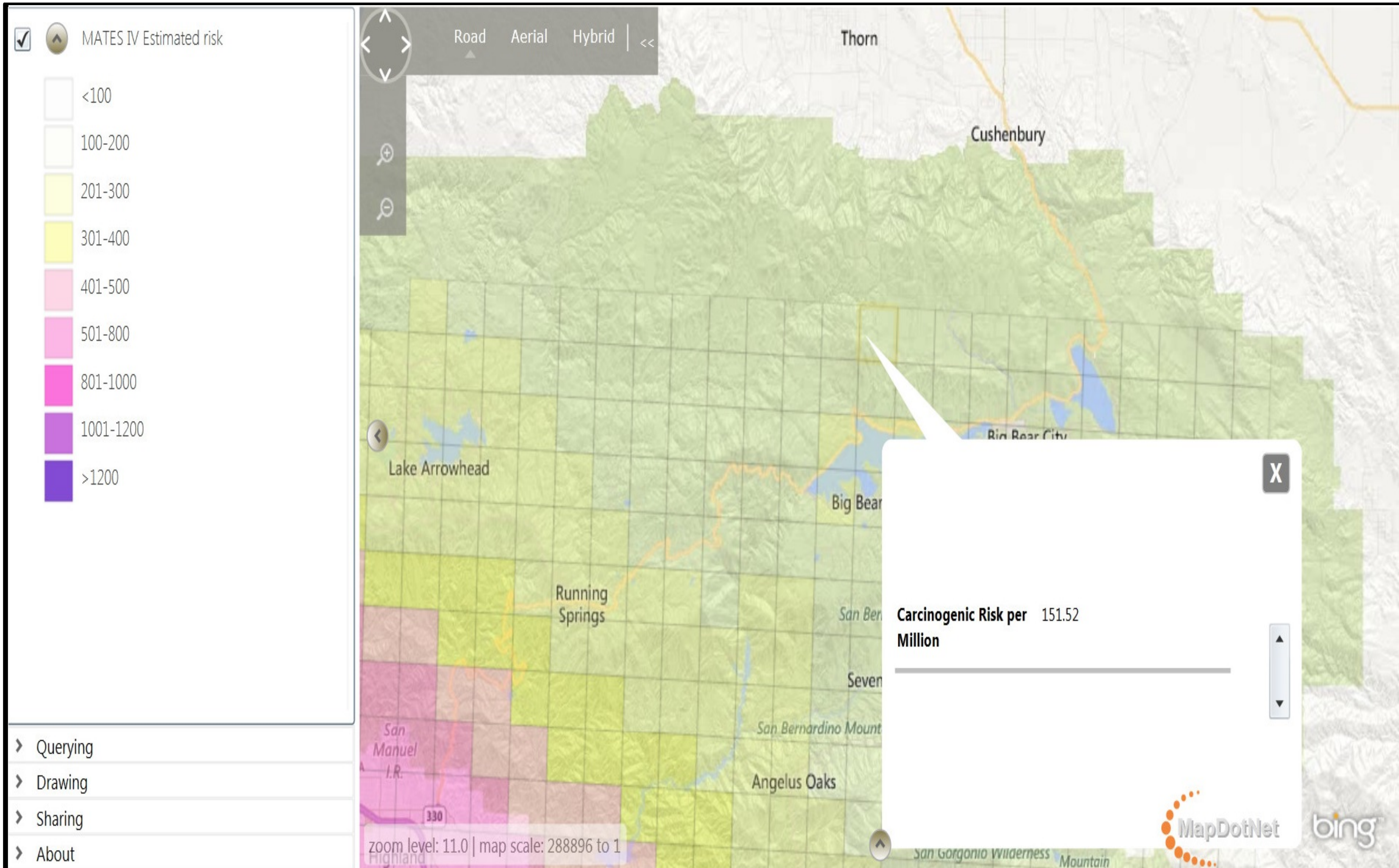
FIGURE 1	Site Location OMYA San Bernardino National Forest California		
PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC



Numbered items are Volume Sources (e.g. 1 is VOL1, 2 is VOL 2, etc.) Lettered items are line sources which are dissociated into individual volume sources beginning with the letter shown (e.g. road segment A is modeled as a number of volume sources A001, A002, etc.).

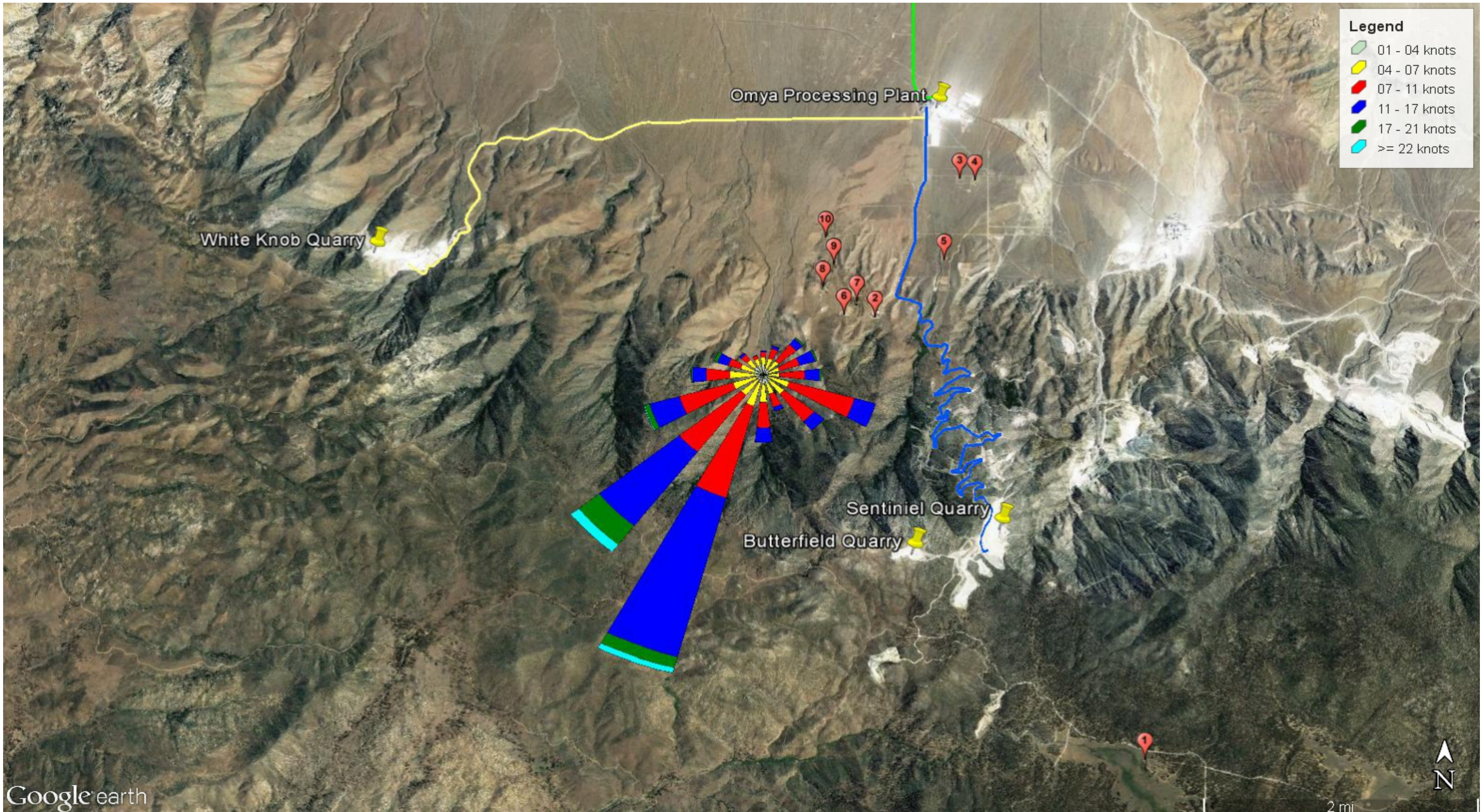
SESPE CONSULTING, INC.

FIGURE	**Site Plan**		
2	OMYA San Bernardino National Forest California		
PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC



SESPE CONSULTING, INC.

FIGURE 3	SCAQMD MATES IV Risk Map OMYA San Bernardino National Forest California		
PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC

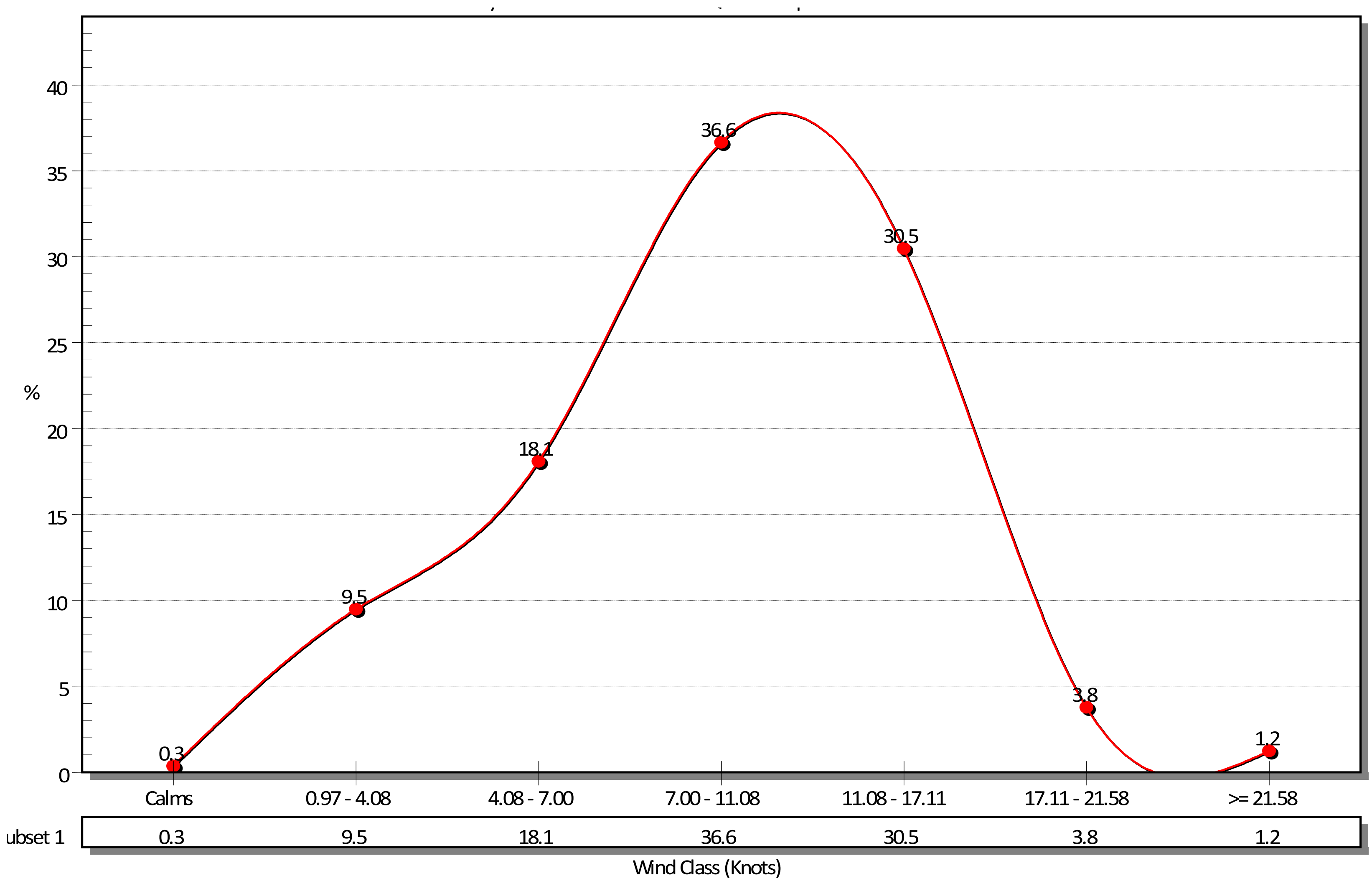


Notes: MM5 predictive meteorological data used in dispersion modeling was generated by Lakes Environmental based on coordinate provided by Sesped depicted as center of windrose. Coordinate chosen between Project site, White Knob Quarry, and nearby receptors. See also Figures 5 & 6.

N

SESPE CONSULTING, INC.

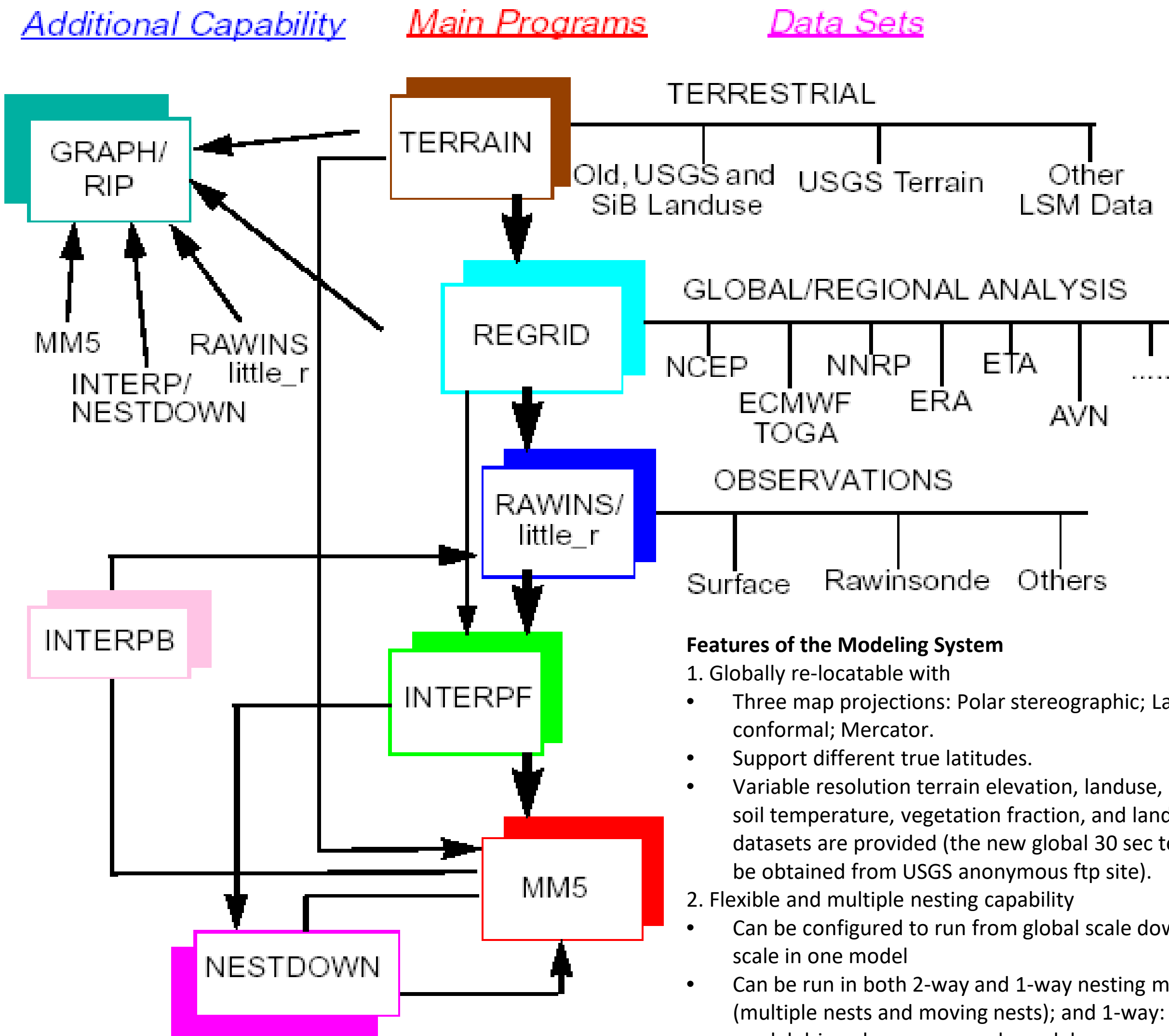
FIGURE 4		Wind Rose (blowing from) OMYA San Bernardino National Forest California	
PROJECT #:	OM01	DATE:	10/25/17
SCALE:	As shown	DRAWN BY:	SDC



Notes: MM5 predictive meteorological data used in dispersion modeling was generated by Lakes Environmental based on coordinate provided by Sespe depicted as center of windrose. Coordinate chosen between Project site, White Knob Quarry, and nearby receptors. See also Figures 4 & 6.

SESPE CONSULTING, INC.

FIGURE 5	**Wind Speed Frequency Distribution** OMYA San Bernardino National Forest California		
PROJECT #:	OM01	DATE:	10/25/17
SCALE:	As shown	DRAWN BY:	SDC



Features of the Modeling System

1. Globally re-locatable with
   - Three map projections: Polar stereographic; Lambert conformal; Mercator.
   - Support different true latitudes.
   - Variable resolution terrain elevation, landuse, soil type, deep soil temperature, vegetation fraction, and land-water mask datasets are provided (the new global 30 sec terrain data may be obtained from USGS anonymous ftp site).
2. Flexible and multiple nesting capability
   - Can be configured to run from global scale down to cloud scale in one model
   - Can be run in both 2-way and 1-way nesting mode: 2-way (multiple nests and moving nests); and 1-way: fine-mesh model driven by coarse-mesh model
   - Nest domain can start and stop at any time.
   - Nest terrain file may be input at the time of nest start-up in the model.
3. Real-data inputs
   - Can be configured to run from global scale down to cloud scale in one model
   - Can be run in both 2-way and 1-way nesting mode: 2-way (multiple nests and moving nests); models and other regional models: Use other model's output either as first guess for objective analysis, or as lateral boundary conditions, e.g. NCEP and ECMWF global analysis, NCEP/NCAR and ECMWF reanalysis, NCEP ETA model.
4. Non-hydrostatic and hydrostatic (V2 only) dynamic frameworks.
5. Terrain-following vertical coordinates.
6. Choices of advanced physical parameterization.
7. Four-dimensional data assimilation system via nudging.
8. Adjoint model and 3DVAR.
9. Runs on various computer platforms (e.g., Cray, SGI, IBM, Alpha, Sun, HP, and PCs running Linux).
10. Parallelization on shared-memory machines (e.g., Cray (EL, J90, YMP), HP-SPP2000, SGI, SUN, Alpha, and Linux); or distributed-memory machines (e.g., IBM SP2, Cray T3E, SGI Origin 2000, HP-SPP2000, Fujitsu VPP, Sun and Linux clusters).

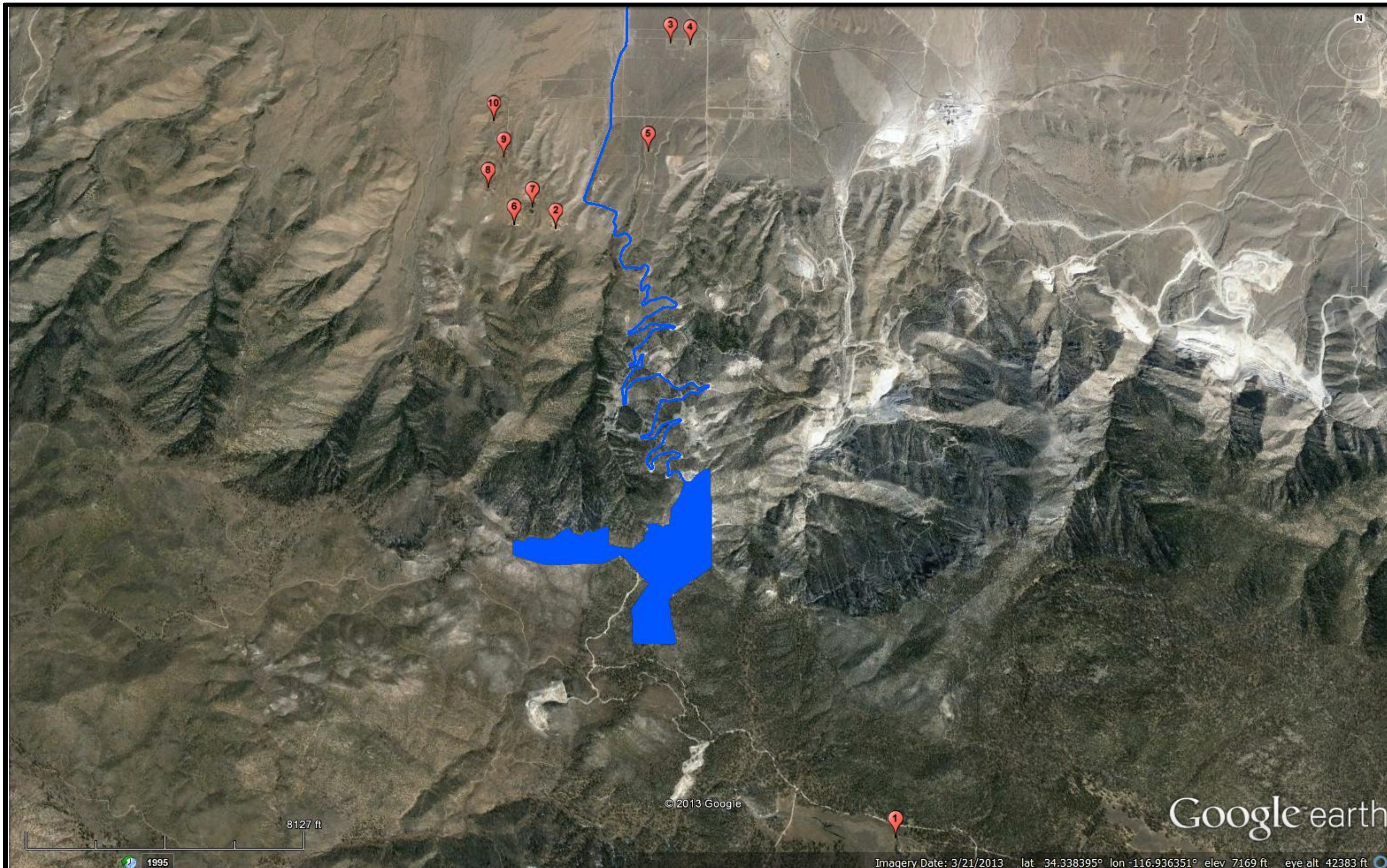
Well-documented, and user-support available.

As discussed in Item 3 above, MM5 incoporates surface and upper air measurements which would normally be used in AERMOD and interpolates wind conditions in locations that are far from or otherwise not represented by the observation stations. For more information on MM5, check the EPA website and the UCAR website below.

Source: http://www2.mmm.ucar.edu/mm5/overview.html

SESPE CONSULTING, INC.

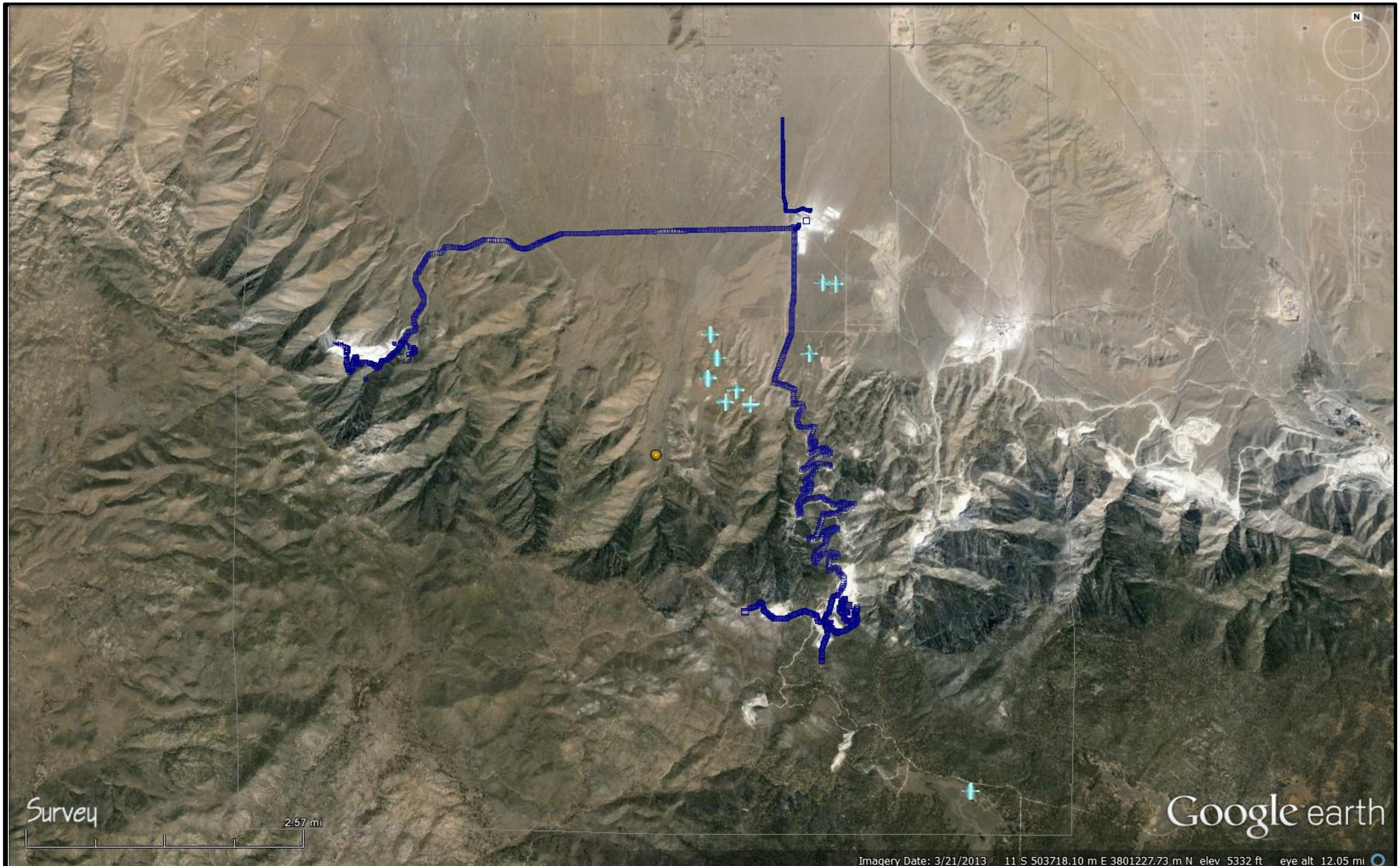
FIGURE 6	MM5 Modeling System Flow Chart OMYA San Bernardino National Forest California		
PROJECT #:	OM01.12.06	DATE:	10/25/17
SCALE:	as shown	DRAWN BY:	SDC



Discrete Receptors numbers are shown in red markers.
Operational areas are shown in blue.

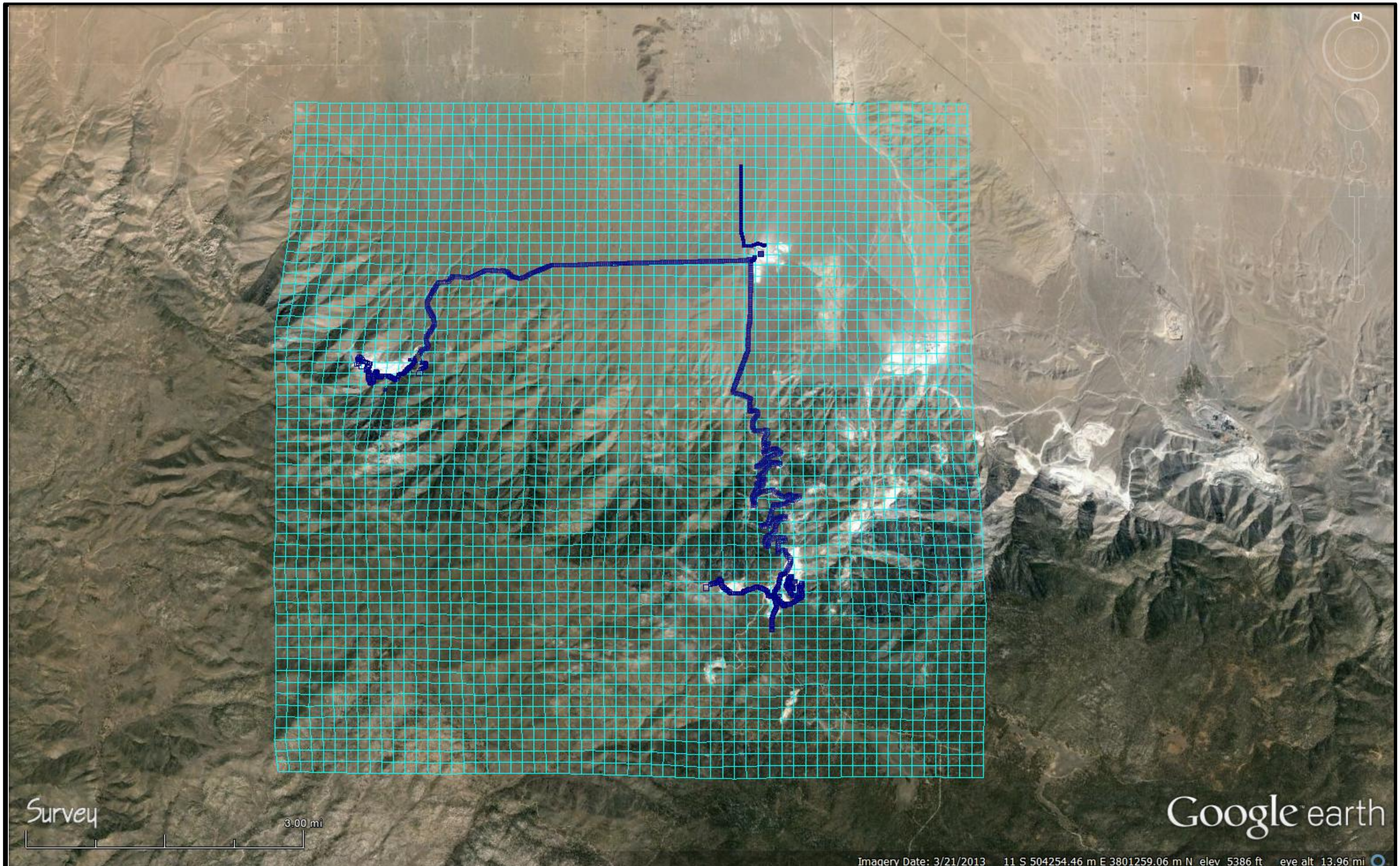
SESPE CONSULTING, INC.

FIGURE 7	Discrete Receptors in HRA Model OMYA San Bernardino National Forest California		
PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC



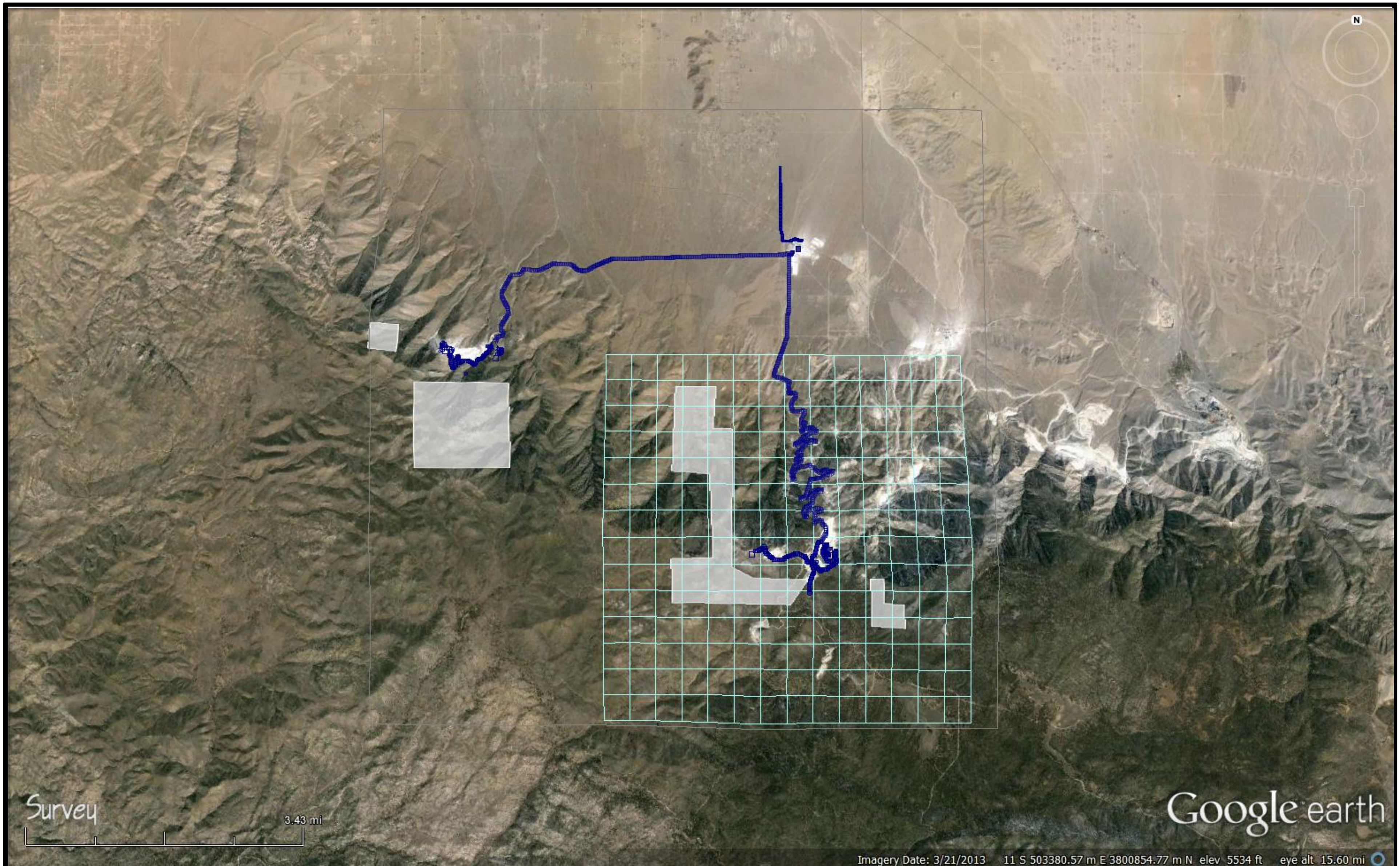
SESPE CONSULTING, INC.

FIGURE	Boundary Receptors in PM Model OMYA San Bernardino National Forest California		
8			
PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC



SESPE CONSULTING, INC.

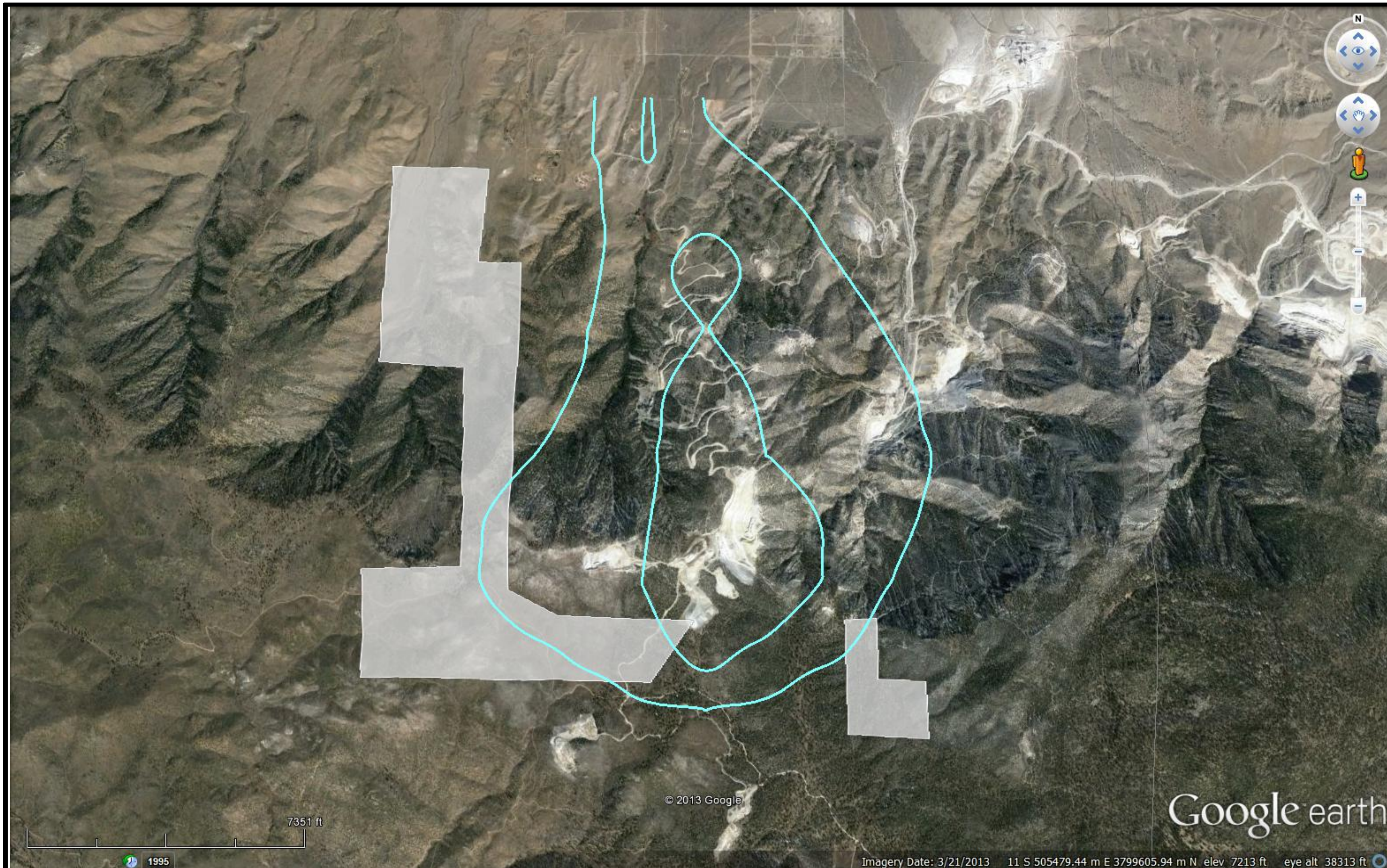
FIGURE 9	Grid Receptors in HRA Model OMYA San Bernardino National Forest California		
PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC



White areas represent Stage 1 Priority Areas from the Carbonate Habitat Management Strategy.

SESPE CONSULTING, INC.

FIGURE	Grid Receptors in Deposition Model		
10	OMYA San Bernardino National Forest California		
PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC



White areas represent Stage 1 Priority Areas from the Carbonate Habitat Management Stategy.
Contours are for 1.0 and 5.0 grams per meter squared per year.

SESPE CONSULTING, INC.

FIGURE

11

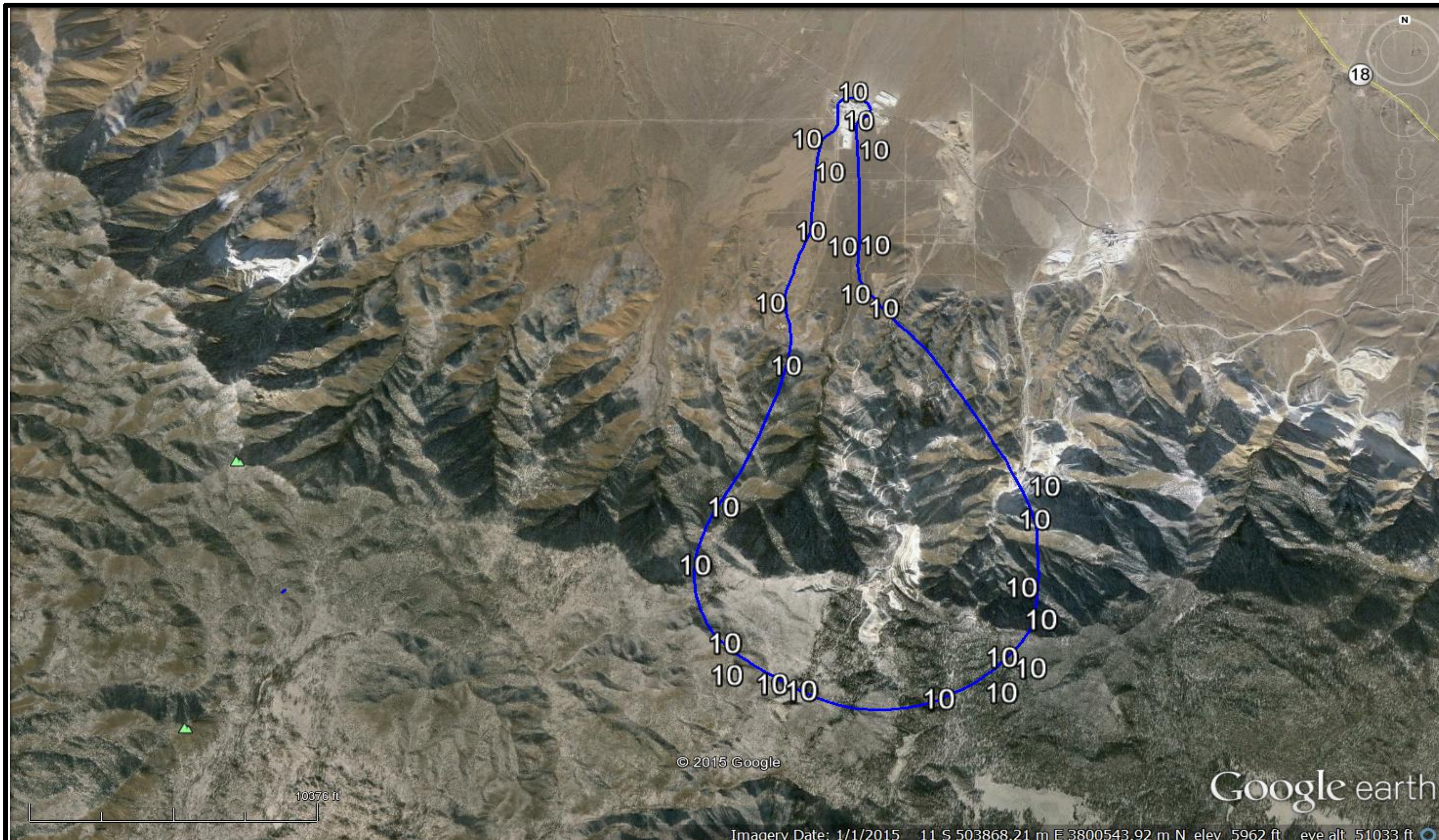
Annual Deposition
OMYA
San Bernardino National Forest
California

PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC

White areas represent Stage 1 Priority Areas from the Carbonate Habitat Management Stategy.
Contours are for 1.0 and 5.0 grams per meter squared per year.

SESPE CONSULTING, INC.

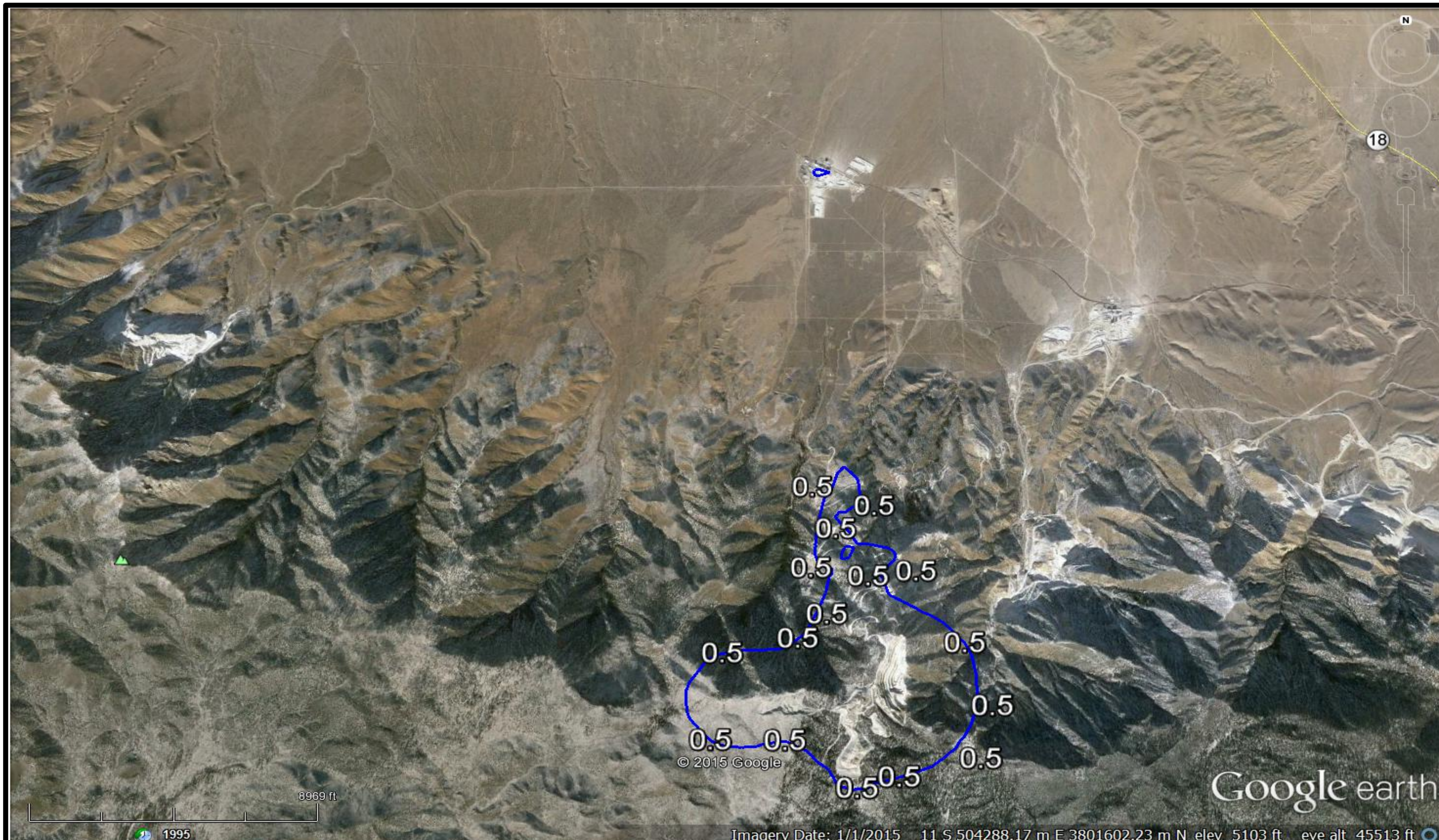
FIGURE 12	Daily Deposition OMYA San Bernardino National Forest California		
PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC



Cancer risk in units of excess cancer cases per million individuals exposed.

SESPE CONSULTING, INC.

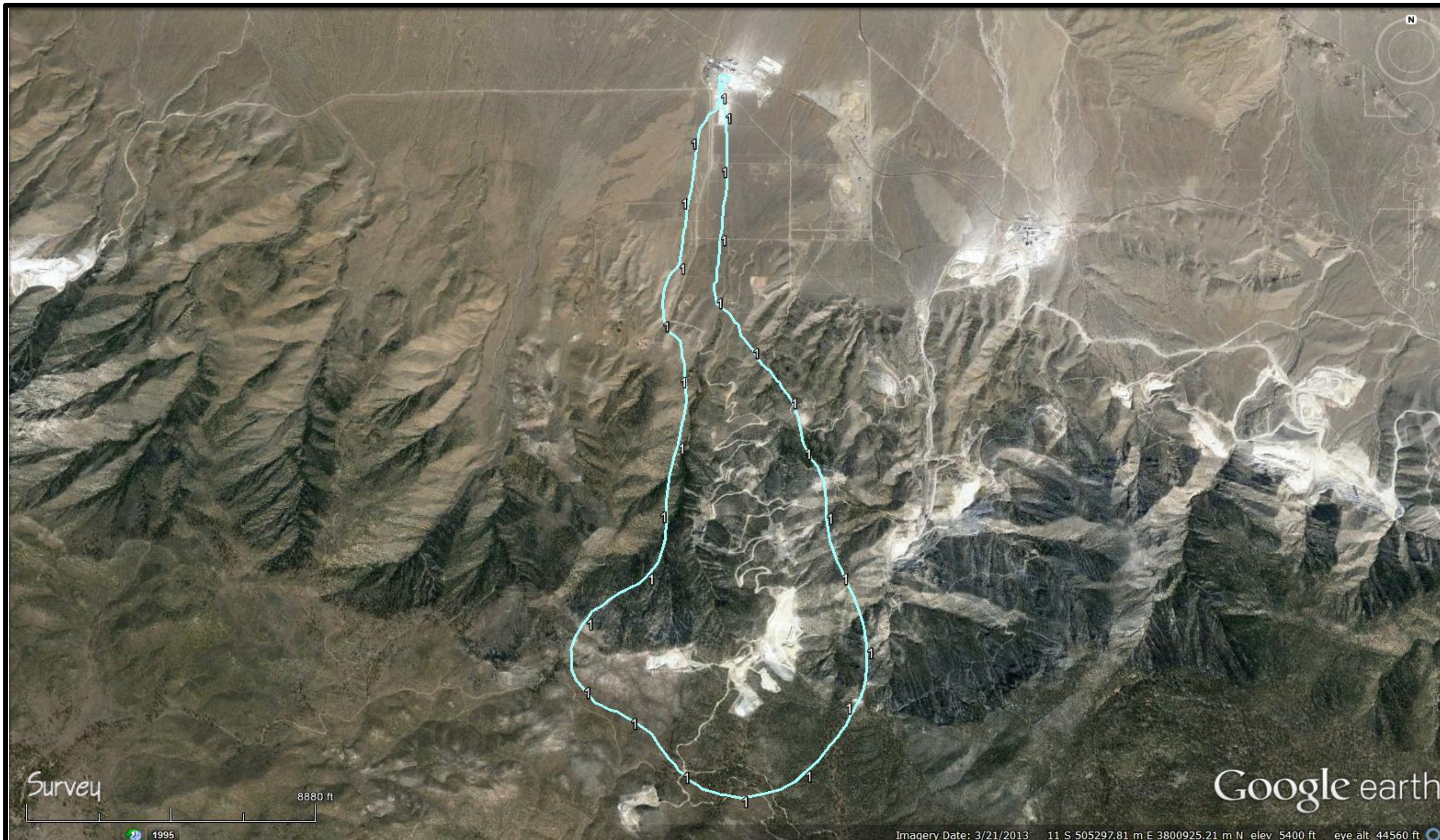
FIGURE 13	**Cancer Risk at Sensitive Receptors - Project Increment** OMYA San Bernardino National Forest California		
PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC



Non-cancer health risk is in units of hazard index.

SESPE CONSULTING, INC.

FIGURE 14	**Chronic Risk at Sensitive Receptors - Project Increment** OMYA San Bernardino National Forest California		
PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC



Cancer risk in units of excess cancer cases per million individuals exposed

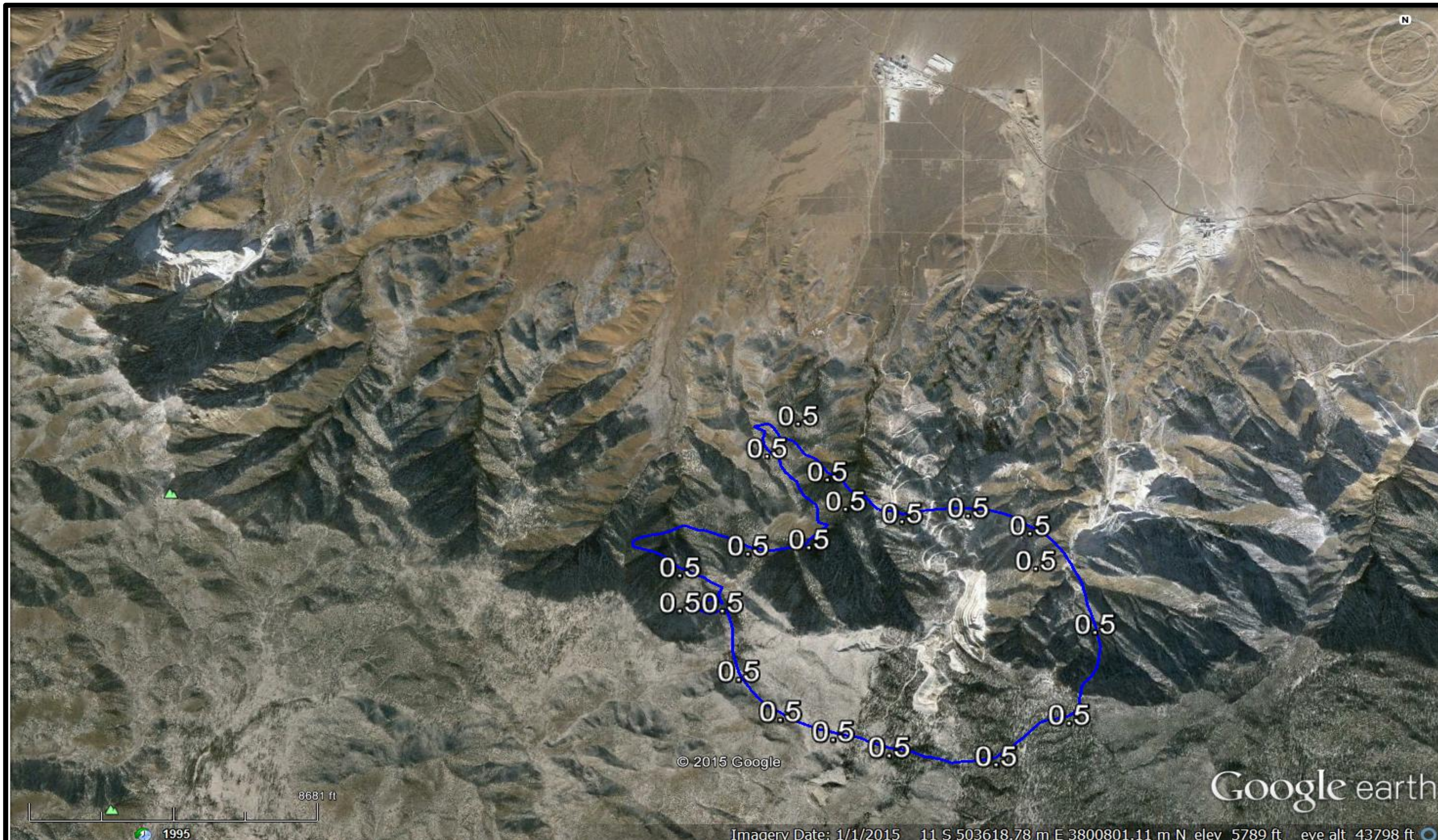
SESPE CONSULTING, INC.

FIGURE **15**	**Cancer Risk at Worker Receptors - Project Increment** OMYA San Bernardino National Forest California		
PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC

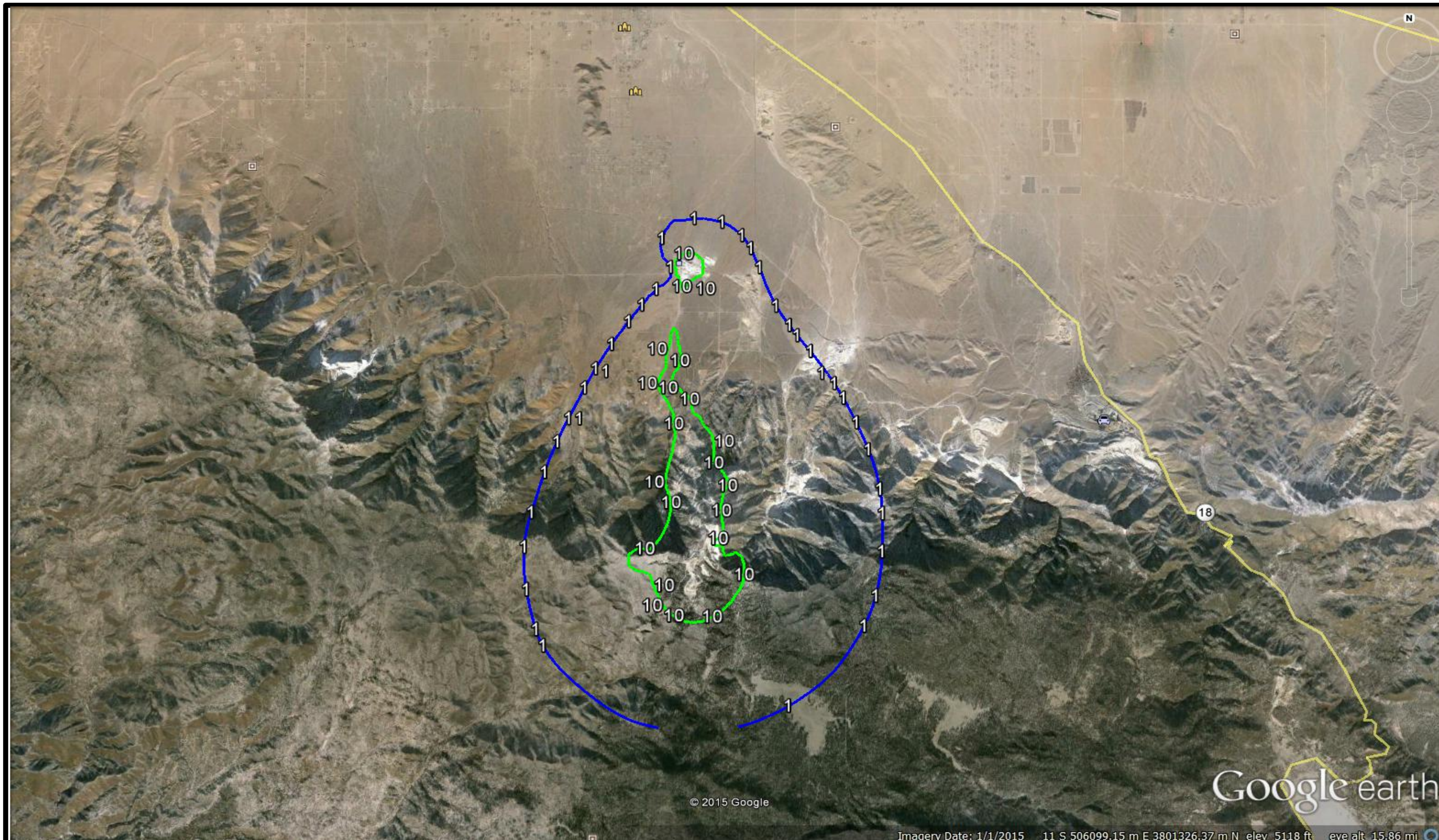
Non-cancer health risk is in units of hazard index.

SESPE CONSULTING, INC.

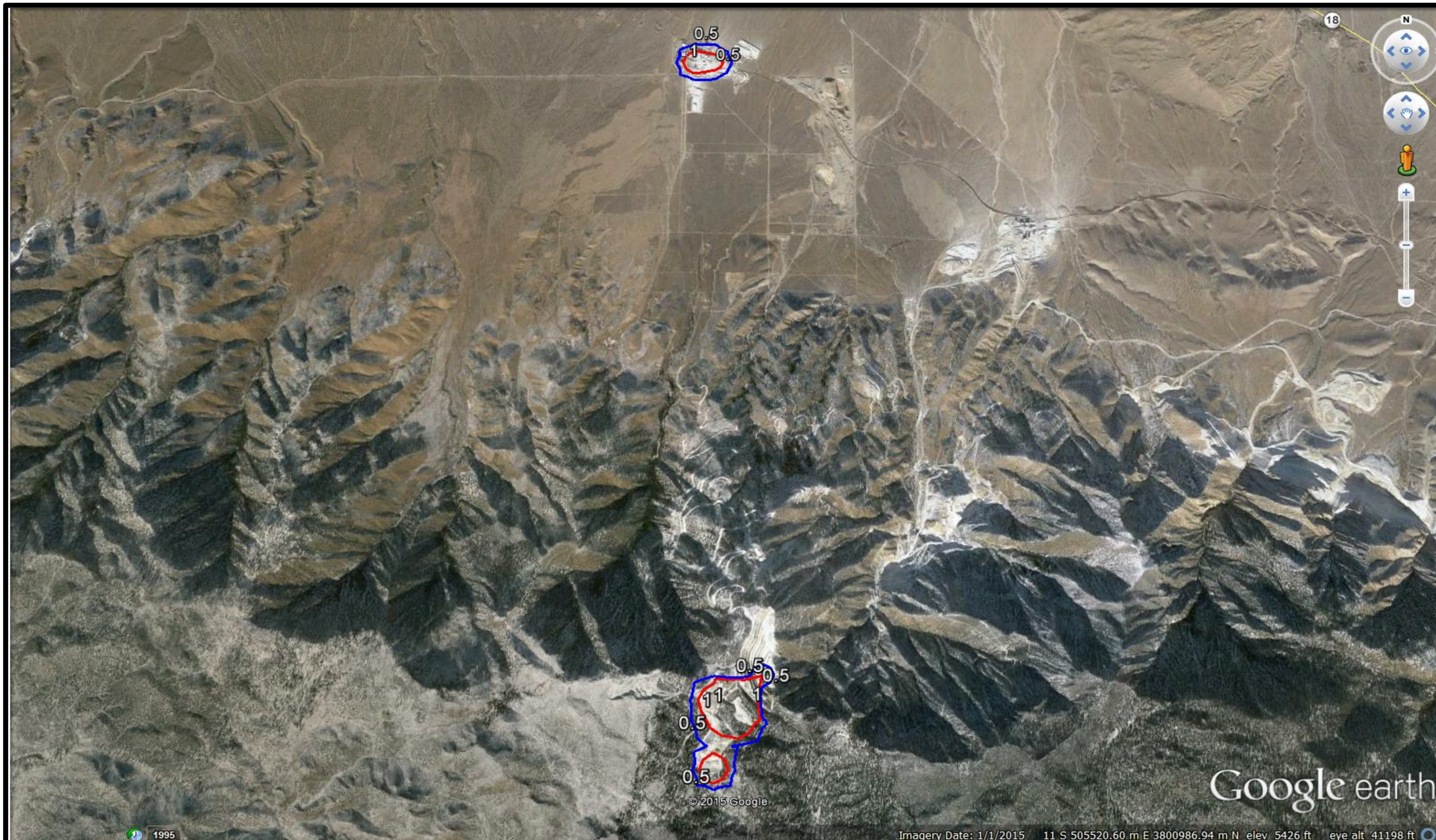
FIGURE 16	**Chronic Risk at Worker Receptors - Project Increment** OMYA San Bernardino National Forest California		
PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC



Non-cancer health risk is in units of hazard index.	SESPE CONSULTING, INC.	FIGURE 17	Acute Risk - Project Increment OMYA San Bernardino National Forest California		
		PROJECT #:	OM01.12.06	DATE:	12/31/15
		SCALE:	as shown	DRAWN BY:	SDC



Cancer risk in units of excess cancer cases per million individuals exposed.	SESPE CONSULTING, INC.	**FIGURE** **18**	**Cancer Risk at Sensitive Receptors - Alternative 4** OMYA San Bernardino National Forest California		
		PROJECT #:	OM01.12.06	DATE:	12/31/15
		SCALE:	as shown	DRAWN BY:	SDC

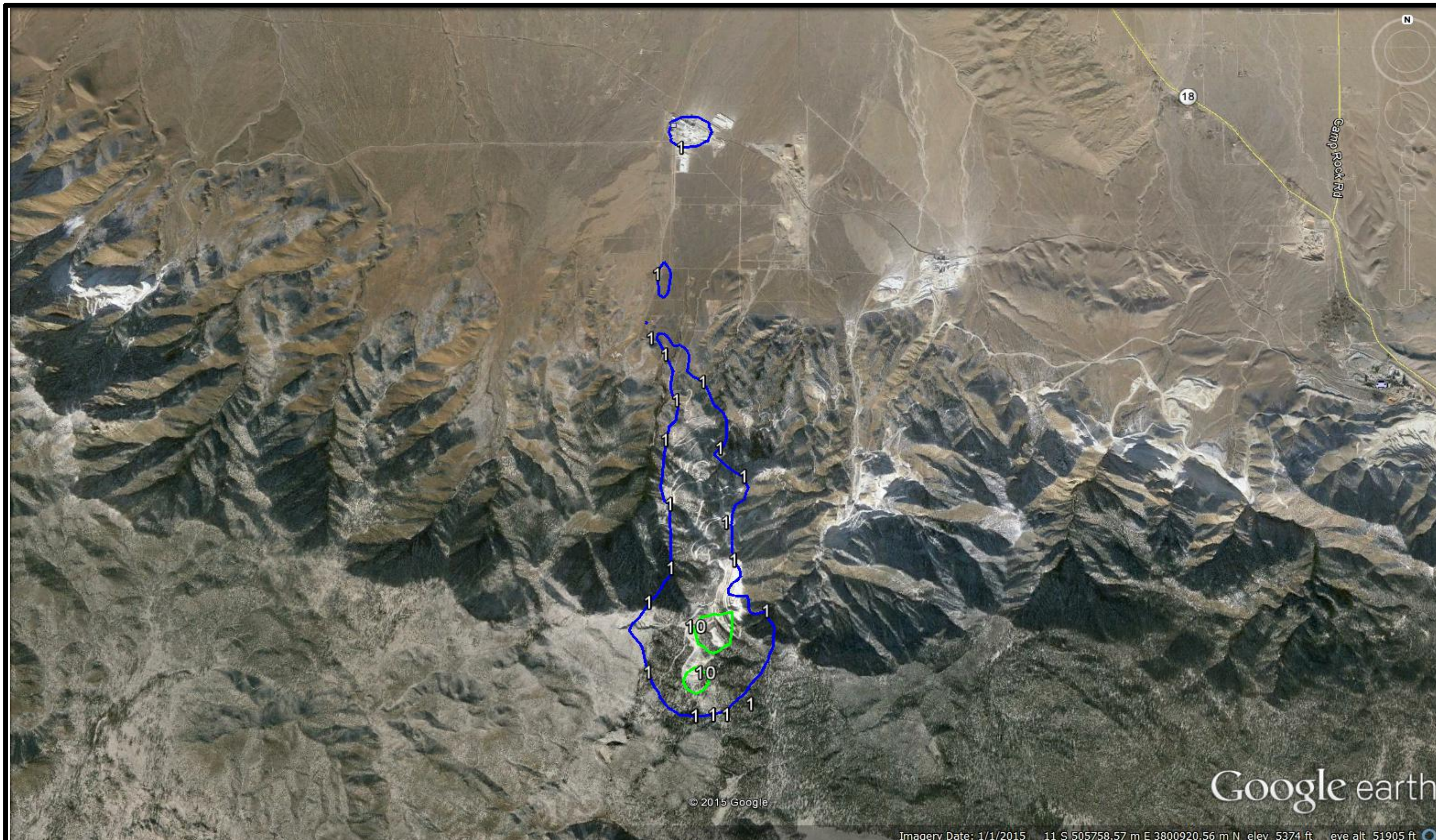


Non-cancer health risk is in units of hazard index.

H.I. of 1 is shown in red.
H.I. of 0.5 is shown in blue.

SESPE CONSULTING, INC.

FIGURE 19	**Chronic risk at Sensitive Receptors - Alternative 4** OMYA San Bernardino National Forest California		
PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC

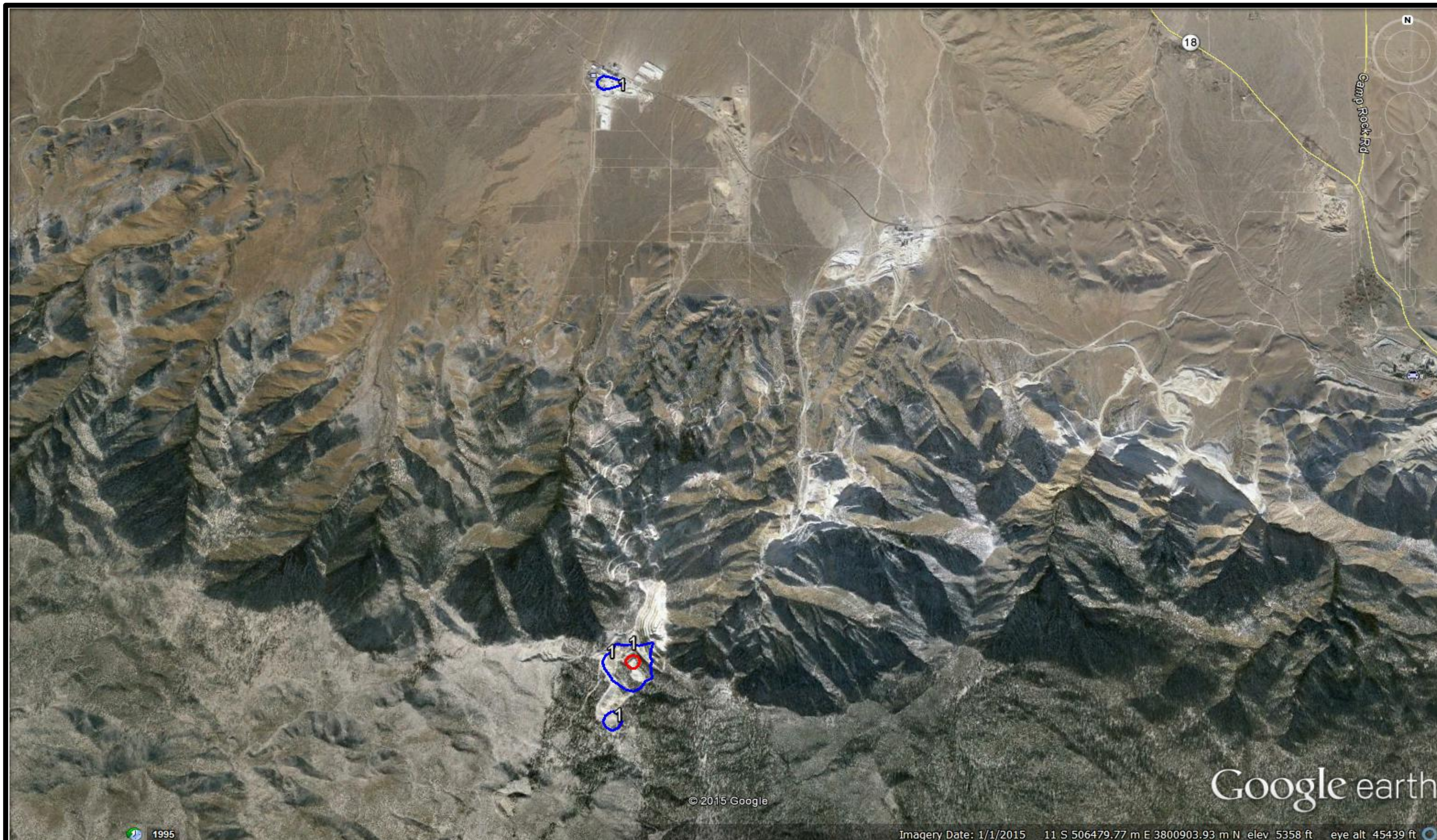


Cancer risk in units of excess cancer cases per million individuals exposed.

1 case per million is shown in blue.
10 cases per million are shown in green.

SESPE CONSULTING, INC.

FIGURE 20	**Cancer Risk at Worker Receptors - Alternative 4** OMYA San Bernardino National Forest California		
PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC

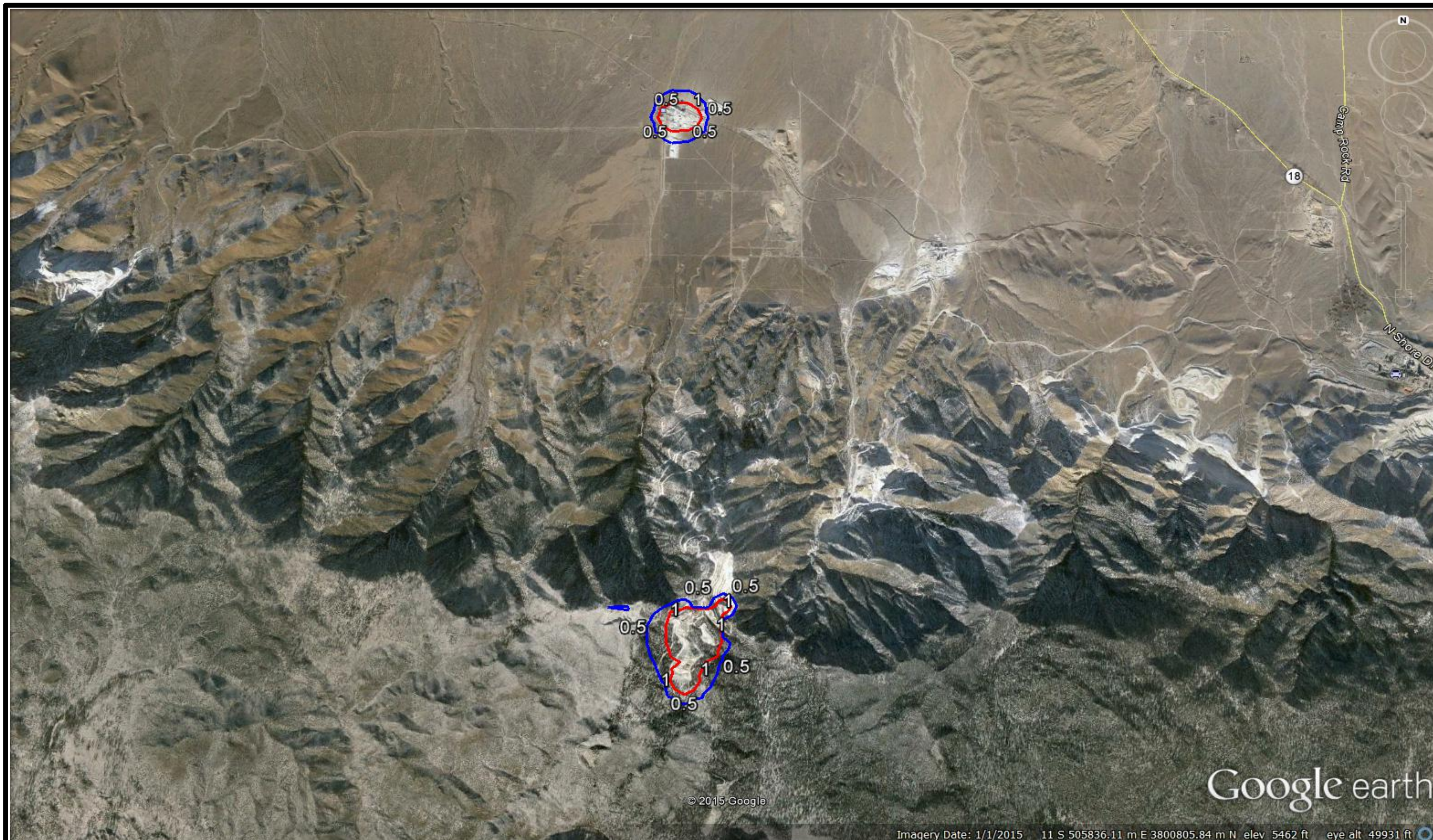


Non-cancer health risk is in units of hazard index.

H.I. of 1 is shown in red.
H.I. of 0.5 is shown in blue.

SESPE CONSULTING, INC.

FIGURE 21	**Chronic Risk at Worker Receptors - Alternative 4** OMYA San Bernardino National Forest California		
PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC



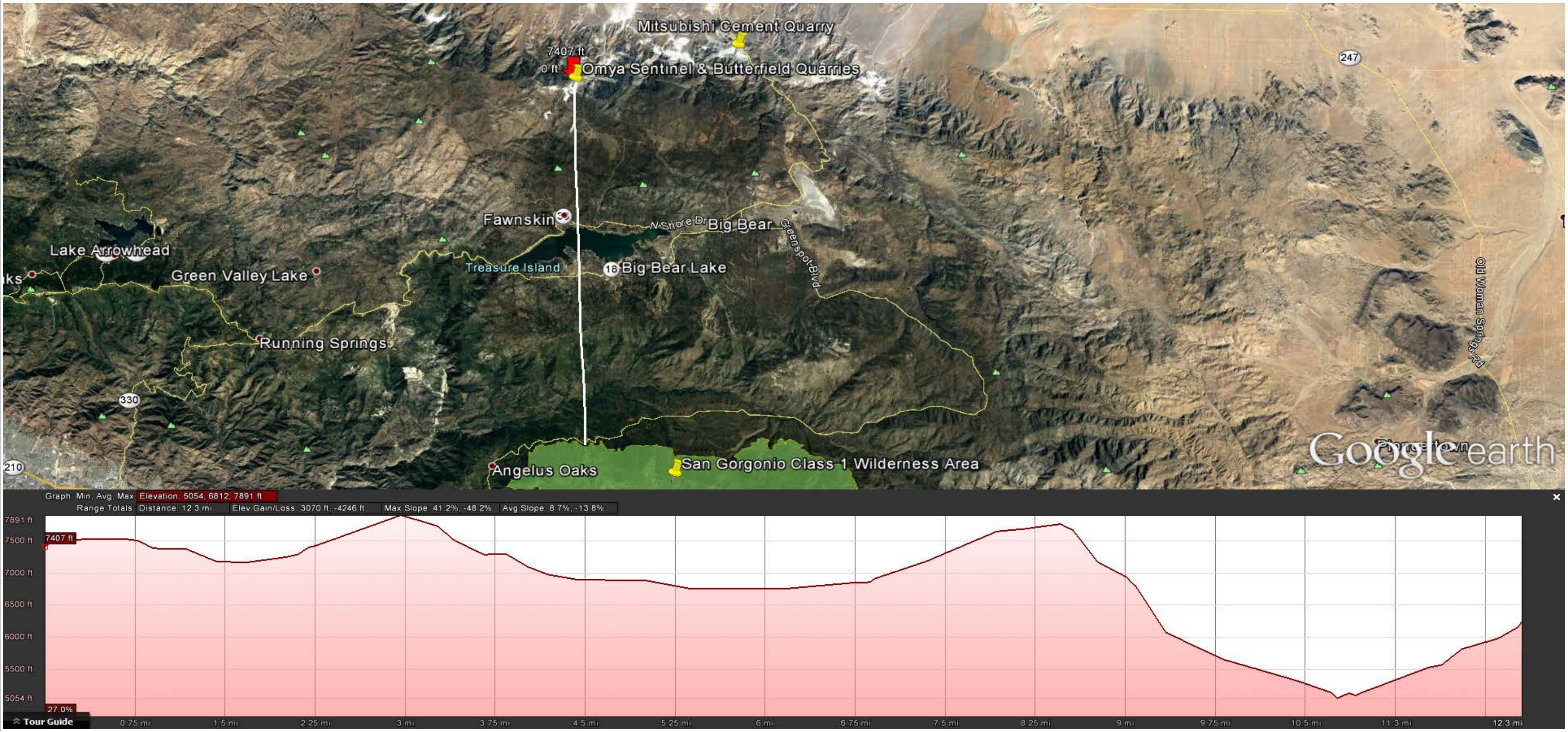
Non-cancer health risk is in units of hazard index (H.I.).

H.I. of 1 in red

H.I. of 0.5 in blue

SESPE CONSULTING, INC.

FIGURE 22	**Acute Risk - Alternative 4** OMYA San Bernardino National Forest California		
PROJECT #:	OM01.12.06	DATE:	12/31/15
SCALE:	as shown	DRAWN BY:	SDC



N

SESPE CONSULTING, INC.

FIGURE 23	Elevation Profile OMYA Sentinel-Butterfield Quarries to San Gorgonio Class 1 Wilderness Area		
PROJECT #:	OM01	DATE:	7/19/17
SCALE:	As shown	DRAWN BY:	SDC

Appendix B: Health Effects of Air Pollutants

APPENDIX B: HEALTH EFFECTS OF POLLUTANTS

Discussion presented in this section is mainly reproduced from Appendix C of the Guidelines for Preparing an Air Quality Assessment for Use in Environmental Impact Reports (County of Kern, 2006). The health effects of pollutants do not change between jurisdictions and so the information is relevant in San Bernardino County as well.

B-1.0 OZONE

Ozone occurs in two layers of the atmosphere. The layer surrounding the earth's surface is the troposphere. Here, ground level or "bad" ozone is an air pollutant that damages human health, vegetation, and many common materials. It is a key ingredient of urban smog. The troposphere extends to a level about 10 miles up, where it meets the second layer, the stratosphere. The stratospheric or "good" ozone layer extends upward from about 10 to 30 miles and protects life on earth from the sun's harmful ultraviolet rays (UV-B).

"Bad" ozone is what is known as a photochemical pollutant. It needs reactive organic gases (ROG), oxides of nitrogen (NOx), and sunlight. ROG and NOx are emitted from various sources throughout San Bernardino County. In order to reduce ozone concentrations, it is necessary to control the emissions of these ozone precursors.

Significant ozone formation generally requires an adequate amount of precursors in the atmosphere and several hours in a stable atmosphere with strong sunlight.

Ozone is a regional air pollutant. It is generated over a large area and is transported and spread by wind. Ozone, the primary constituent of smog, is the most complex, difficult to control, and pervasive of the criteria pollutants. Unlike other pollutants, ozone is not emitted directly into the air by specific sources. Ozone is created by sunlight acting on other air pollutants (called precursors), specifically NOX and ROGs. Sources of precursor gases to the photochemical reaction that form ozone number in the thousands. Common sources include consumer products, gasoline vapors, chemical solvents, and combustion products of various fuels. Originating from gas stations, motor vehicles, large industrial facilities, and small businesses such as bakeries and dry cleaners, the ozone forming chemical reactions often take place in another location, catalyzed by sunlight and heat. High ozone concentrations can form over large regions when emissions from motor vehicles and stationary sources are carried hundreds of miles from their origins. Approximately 50 million people lived in counties with air quality levels above U. S. EPA's health-based national air quality standard in 1994. The highest levels of ozone were recorded in Los Angeles. High levels also persist in other heavily populated areas including the Texas Gulf Coast and much of the Northeast.

While the ozone in the upper atmosphere absorbs harmful ultraviolet light, ground-level ozone is damaging to the tissues of plants, animals, and humans, as well as to a wide variety of inanimate materials such as plastics, metals, fabrics, rubber, and paints. Societal costs from ozone damage include increased medical costs, the loss of human and animal life, accelerated replacement of industrial equipment, and reduced crop yields.

Health Effects

While ozone in the upper atmosphere protects the earth from harmful ultraviolet radiation, high concentrations of ground level ozone can adversely affect the human respiratory system. Many respiratory ailments, as well as cardiovascular disease, are aggravated by exposure to high ozone levels. Ozone also damages natural ecosystems such as forests and foothill communities, and damages agricultural crops and some man-made materials, such as rubber, paint, and plastics. High levels of ozone may negatively impact immune systems making people more susceptible to respiratory illnesses including bronchitis and pneumonia. Ozone also accelerates aging and exacerbates pre-existing asthma and bronchitis and in cases of high concentrations can lead to the development of asthma in active children. Active people, both children and adults, appear to be more at risk from ozone exposure than those with a low level of activity. Additionally, the elderly and those with respiratory disease are also considered sensitive populations for ozone.

People who work or play outdoors are at a greater risk for harmful health effects from ozone. Children and adolescents are also at greater risk, as they are more likely than adults to spend time engaged in vigorous activities. Research indicates that children under 12 years of age spend nearly twice as much time outdoors daily than adults. Teenagers spend at least twice as much time as adults in active sports and outdoor activities. Also, children inhale more air per pound of body weight than adults, and they breathe more rapidly than adults. Children are less likely than adults to notice their own symptoms and avoid harmful exposures.

Ozone is a powerful oxidant – it can be compared to household bleach, which can kill living cells (such as germs or human skin cells) upon contact. Ozone can damage the respiratory tract, causing inflammation and irritation, and it can induce symptoms such as coughing, chest tightness, shortness of breath, and worsening of asthma symptoms. Ozone in sufficient doses increases the permeability of lung cells, rendering them more susceptible to toxins and microorganisms. Exposure to levels of ozone above the current ambient air quality standard leads to lung inflammation and lung tissue damage, and a reduction in the amount of air inhaled into the lungs. Recent evidence has, for the first time, linked the onset of asthma to exposure to elevated ozone levels in exercising children (McConnell, et al., 2002). Elevated ozone concentrations also reduce crop and timber yields, damage native plants, and damage materials such as rubber, paints, fabric, and plastics (CARB and American Lung Association, 2004).

B-2.0 REACTIVE ORGANIC GASES AND VOLATILE ORGANIC COMPOUNDS

Hydrocarbons are organic gases that are formed solely of hydrogen and carbon. There are several subsets of organic gases including Volatile Organic Compounds (VOCs) and Reactive Organic Gases (ROGs). ROGs include all hydrocarbons except those exempted by the California Air Resources Board. Therefore, ROGs are a set of organic gases based on state rules and regulations. VOCs are similar to ROGs in that they include all organic gases except those exempted by federal law. The list of compounds exempt from the definition of VOC is included by the SJVAPCD and is presented in District Rule 1102. Both VOCs and ROGs are emitted from incomplete combustion of hydrocarbons or other carbon-based fuels. Combustion engine exhaust, oil refineries, and oil fueled power plants are the primary sources of hydrocarbons. Another source of hydrocarbons is evaporation from petroleum fuels, solvents, dry cleaning solutions, and paint.

Health Effects

The primary health effects of hydrocarbons result from the formation of ozone and its related health effects (see ozone health effects discussion above). High levels of hydrocarbons in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement. There are no separate federal or California ambient air quality standards for ROG. Carcinogenic forms of ROG are considered toxic air contaminants (TACs). An example is benzene, which is a carcinogen. The health effects of individual ROGs are described below under the toxic air contaminants heading below.

B-3.0 CARBON MONOXIDE

Carbon monoxide (CO) is emitted by mobile and stationary sources as a result of incomplete combustion of hydrocarbons or other carbon-based fuels. CO is an odorless, colorless, poisonous gas that is highly reactive. CO is a byproduct of motor vehicle exhaust, which contributes more than two-thirds of all CO emissions nationwide. In cities, automobile exhaust can cause as much as 95% of all CO emissions. These emissions can result in high concentrations of CO, particularly in local areas with heavy traffic congestion. Other sources of CO emissions include industrial processes and fuel combustion in sources such as boilers and incinerators. Despite an overall downward trend in concentrations and emissions of CO, some metropolitan areas still experience high levels of CO.

Health Effects

CO enters the bloodstream and binds more readily to hemoglobin than oxygen, reducing the oxygen-carrying capacity of blood, thus reducing oxygen delivery to organs and tissues. The health threat from CO is most serious for those who suffer from cardiovascular disease. Healthy individuals are also affected, but only at higher levels of exposure. Carbon monoxide binds strongly to hemoglobin, the oxygen-carrying protein in blood, and thus reduces the blood’s capacity for carrying oxygen to the heart, brain, and other parts of the body. Exposure to carbon monoxide can cause chest pain in heart patients, headaches, and reduced mental alertness. At high concentrations, CO can cause heart difficulties in people with chronic diseases, and can impair mental abilities. Exposure to elevated CO levels is associated with visual impairment, reduced work capacity, reduced manual dexterity, poor learning ability, difficulty performing complex tasks, and in prolonged, enclosed exposure, death.

The adverse health effects associated with exposure to ambient and indoor concentrations of CO are related to concentration of carboxyhemoglobin (COHb) in the blood. Health effects observed may include early onset of cardiovascular disease, behavioral impairment; decreased exercise performance of young healthy men, reduced birth weigh, Sudden Infant Death Syndrome (SIDS), and increased daily mortality rate (Fierro, O'Rourke, & Burgess, 2001). Most of the studies evaluating adverse health effects of CO on the central nervous system examine high-level poisoning. Such poisoning results in symptoms ranging from common flu and cold symptoms (shortness of breath on mild exertion, mild headaches, and nausea) to unconsciousness and death. Hexter and Goldsmith report an association between daily death rate and exposure to ambient CO in Los Angeles County. They postulate a concentration of 20.2 ppm (the highest daily concentration recorded during a 4 year period) contributed 11 out of 159 deaths (Hexter & Goldsmith, 1971). Additional studies conducted in Los Angeles (Kinney & Ozkaynak, 1991) and Sao Paulo also suggest a relationship between daily death rates and CO concentrations (Saldivia, et al., 1995).

B-4.0 NITROGEN OXIDES

Nitrogen oxides (NOx) are a family of highly reactive gases that are a primary precursor to the formation of ground-level ozone, and react in the atmosphere to form acid rain. NOx is emitted from the use of solvents and combustion processes in which fuel is burned at high temperatures, principally from motor vehicle exhaust and stationary sources such as electric utilities and industrial boilers. A brownish gas, nitrogen dioxide is a strong oxidizing agent that reacts in the air to form corrosive nitric acid, as well as toxic organic nitrates.

Health Effects

NOx is an ozone precursor that combines with ROG to form ozone. See the ozone section above for a discussion of the health effects of ozone. Direct inhalation of NOx can also cause a wide range of health effects.

NOx can irritate the lungs, cause lung damage, and lower resistance to respiratory infections such as influenza. Short-term exposures (e.g., less than 3 hours) to low levels of NO_2 may lead to changes in airway responsiveness and lung function in individuals with preexisting respiratory illnesses. These exposures may also increase respiratory illnesses in children. Long-term exposures to NO_2 may lead to increased susceptibility to respiratory infection and may cause irreversible alterations in lung structure. Other health effects associated with NOx are an increase in the incidence of chronic bronchitis and lung irritation. Chronic exposure to nitrogen dioxide (NO_2) may lead to eye and mucus membrane aggravation, along with pulmonary dysfunction. NOx can cause fading of textile dyes and additives, deterioration of cotton and nylon, and corrosion of metals due to production of particulate nitrates. Airborne NOx can also impair visibility. NOx is a major component of acid deposition in California. NOx may affect both terrestrial and aquatic ecosystems. NOx in the air is a potentially significant contributor to a number of environmental effects such as acid rain and eutrophication in coastal waters. Eutrophication occurs when a body of water suffers an increase in nutrients that reduce the amount of oxygen in the water, producing an environment that is destructive to fish and other animal life.

Nitrogen dioxide is toxic to various animals as well as to humans. Its toxicity relates to its ability to combine with water to form nitric acid in the eye, lung, mucus membranes and skin. Studies of the health impacts of NO2 include experimental studies on animals, controlled laboratory studies on humans, and observational studies.

In animals, long-term exposure to NOx increases susceptibility to respiratory infections lowering their resistance to such diseases as pneumonia and influenza. Laboratory studies show susceptible humans, such as asthmatics, exposed to high concentrations of NO_2 can suffer lung irritation and potentially, lung damage.

Epidemiological studies have also shown associations between NO_2 concentrations and daily mortality from respiratory and cardiovascular causes and with hospital admissions for respiratory conditions.

NOx contributes to a wide range of environmental effects directly and when combined with other precursors in acid rain and ozone. Increased nitrogen inputs to terrestrial and wetland systems can lead to changes in plant species composition and diversity. Similarly, direct nitrogen inputs to aquatic ecosystems such as those found in estuarine and coastal waters can lead to eutrophication (a condition that promotes excessive algae growth, which can lead to a severe depletion of dissolved oxygen and increased levels of toxins harmful to aquatic life). Nitrogen, alone or in acid rain, also can acidify soils and surface waters. Acidification of soils causes the loss of essential plant nutrients and increased levels of soluble aluminum that are toxic to plants. Acidification of surface waters creates conditions of low pH and levels of aluminum that are toxic to fish and other aquatic organisms. NOx also contribute to visibility impairment. (U.S. EPA, 2005).

B-5.0 PARTICULATE MATTER

Particulate matter pollution consists of very small liquid and solid particles floating in the air. Some particles are large or dark enough to be seen as soot or smoke. Others are so small they can be detected only with an electron microscope. Particulate matter is a mixture of materials that can include smoke, soot, dust, salt, acids, and metals. Particulate matter also forms when gases emitted from motor vehicles and industrial sources undergo chemical reactions in the atmosphere. PM_{10} refers to particles less than or equal to 10 microns in aerodynamic diameter. $PM_{2.5}$ refers to particles less than or equal to 2.5 microns in aerodynamic diameter and are a subset of PM_{10}.

In the western United States, there are sources of PM_{10} in both urban and rural areas. PM_{10} and $PM_{2.5}$ are emitted from stationary and mobile sources, including diesel trucks and other motor vehicles, power plants, industrial processing, wood burning stoves and fireplaces, wildfires, dust from roads, construction, landfills, and agriculture, and fugitive windblown dust. Because particles originate from a variety of sources, their chemical and physical compositions vary widely.

Health Effects

PM10 and PM2.5 particles are small enough – about 1/7th the thickness of a human hair, or smaller– to be inhaled into, and lodge in, the deepest parts of the lung, evading the respiratory system's natural defenses. Health problems begin as the body reacts to these foreign particles.

Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, and coughing, bronchitis, and respiratory illnesses in children. Recent mortality studies have shown a statistically significant direct association between mortality and daily concentrations of particulate matter in the air. Non health-related effects include reduced visibility and soiling of buildings. PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. PM_{10} and $PM_{2.5}$ can aggravate respiratory disease, and cause lung damage, cancer, and premature death.

Although particulate matter can cause health problems for everyone, certain people are especially vulnerable to adverse health effects of PM_{10}. These "sensitive populations" include children, the elderly, exercising adults, and those suffering from chronic lung disease such as asthma or bronchitis. Of greatest concern are recent studies that link PM10 exposure to the premature death of people who already have heart and lung disease, especially the elderly. Acidic PM10 can also damage manmade materials and is a major cause of reduced visibility in many parts of the U.S.

Premature deaths linked to particulate matter are now at levels comparable to deaths from traffic accidents and second-hand smoke. One of the most dangerous pollutants, fine particulate matter (e.g., from diesel exhaust and fireplace soot) not only bypasses the body's defense mechanisms and becomes embedded in the deepest recesses of the lung, but also can disrupt cellular processes. Population based studies in hundreds of cities in the U.S. and around the world have demonstrated a strong link between elevated particulate levels and premature deaths, hospital admissions, emergency room visits, and asthma attacks. Longterm studies of children's health conducted in California have demonstrated that particulate pollution may significantly reduce lung function growth in children (CARB, 2002).

Attaining the California PM standards would annually prevent about 6,500 premature deaths, or 3% of all deaths. These premature deaths shorten lives by an average of 14 years. This is roughly equivalent to the same number of deaths (4,200-7,400) linked to second hand smoke in the year 2000. In comparison, motor vehicle crashes cause 3,200 deaths and homicides were responsible for 2,000 deaths. Attaining the California PM and ozone standards would annually prevent 4,000 hospital admissions for respiratory disease, 3,000 hospital admissions for cardiovascular disease, and 2,000 asthma-related emergency room visits. Exposure to diesel PM causes about 250 excess cancer cases per year in California. (CARB, 2002).

A recent study provides evidence that exposure to particulate air pollution is associated with lung cancer. This study found that residents who live in an area that is severely impacted by particulate air pollution are at risk of lung cancer at a rate comparable to nonsmokers exposed to second-hand smoke. This study also found an approximately 16 percent excess risk of dying from lung cancer due to fine particulate air pollution (Pope III, et al., 2002).

Another study shows that individuals with existing cardiac disease can be in a potentially life-threatening situation when exposed to high levels of ultrafine air pollution. Fine particles can penetrate the lungs and may cause the heart to beat irregularly or can cause inflammation, which could lead to a heart attack (Peters, et al., 2001).

Currently, 61% of California's population live in areas that exceed the federal PM2.5 air standard, while 89% live in areas that exceed California's PM2.5 air standard (California Air Resources Board, 2004).

B-6.0 OTHER POLLUTANTS

Discussion presented in this section is mainly reproduced from Appendix C of the Guidelines for Preparing an Air Quality Assessment for Use in Environmental Impact Reports (County of Kern, 2006).

B-6.1 Sulfur Dioxide

Sulfur dioxide (SO_2) is a colorless, irritating gas with a "rotten egg" smell formed primarily by the combustion of sulfur-containing fossil fuels. Historically, SO_2 was a pollutant of concern but with the successful application of regulations, the levels have been reduced significantly.

High concentrations of SO_2 can result in temporary breathing impairment for asthmatic children and adults who are active outdoors. Short-term exposures of asthmatic individuals to elevated SO_2 levels during moderate activity may result in breathing difficulties that can be accompanied by symptoms such as wheezing, chest tightness, or shortness of breath. Other effects that have been associated with longer-term exposures to high concentrations of SO_2, in conjunction with high levels of PM, include aggravation of existing cardiovascular disease, respiratory illness, and alterations in the lungs' defenses. SO_2 also is a major precursor to $PM_{2.5}$, which is a significant health concern, and a main contributor to poor visibility. (See also the discussion of health effects of particulate matter).

Sulfur dioxide not only has a bad odor, it can irritate the respiratory system. Exposure to high concentrations for short periods of time can constrict the bronchi and increase mucous flow, making breathing difficult. Sulfur dioxide can also:

- Immediately irritate the lung and throat at concentrations greater than 6 parts per million (ppm) in many people.
- Impair the respiratory system's defenses against foreign particles and bacteria, when exposed to concentrations less than 6 ppm for longer time periods.
- Enhance the harmful effects of ozone. (Combinations of the two gases at concentrations occasionally found in the ambient air appear to increase airway resistance to breathing.)

Sulfur dioxide tends to have more toxic effects when acidic pollutants, liquid or solid aerosols, and particulates are also present. (In the 1950s and 1960s, thousands of excess deaths occurred in areas where SO_2 concentrations exceeded 1 ppm for a few days and other pollutants were also high.) Effects are more pronounced among mouth breathers, e.g., people who are exercising or who have head colds. These effects include:

- Health problems, such as episodes of bronchitis requiring hospitalization associated with lower-level acid concentrations.
- Self-reported respiratory conditions, such as chronic cough and difficult breathing, associated with acid aerosol concentrations. (Asthmatic individuals are especially susceptible to these effects. The elderly and those with chronic respiratory conditions may also be affected at lower concentrations than the general population.)
- Increased respiratory tract infections, associated with longer term, lower-level exposures to SO_2 and acid aerosols.
- Subjective symptoms, such as headaches and nausea, in the absence of pathological abnormalities, due to long-term exposure.

Sulfur dioxide easily injures many plant species and varieties, both native and cultivated. Some of the most sensitive plants include various commercially valuable pines, legumes, red and black oaks, white ash, alfalfa and blackberry. The effects include:

- Visible injury to the most sensitive plants at exposures as low as 0.12 ppm for 8 hours.
- Visible injury to many other plant types of intermediate sensitivity at exposures of 0.30 ppm for 8 hours.
- Positive benefits from low levels, in a very few species growing on sulfur deficient soils.
- Increases in sulfur dioxide concentrations accelerate the corrosion of metals, probably through the formation of acids. (SO_2 is a major precursor to acidic deposition.) Sulfur oxides may also damage stone and masonry, paint, various fibers, paper, leather, and electrical components.
- Increased SO_2 also contributes to impaired visibility. Particulate sulfate, much of which is derived from sulfur dioxide emissions, is a major component of the complex total suspended particulate mixture.

B-6.2 Sulfates

Sulfates are particulate products of combustion of sulfur containing fossil fuels. When SO or SO_2 are exposed to oxygen it precipitates out into sulfates (SO_3 or SO_4). Data collected in San Bernardino County identify levels of sulfates that are significantly less than the applicable health standards.

Sulfates ($SO_4^{\ 2-}$) are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and / or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to sulfur dioxide (SO_2) during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features.

The ARB's sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilatory function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and, due to fact that they are usually acidic, can harm ecosystems and damage materials and property (CARB, 2009).

B-6.3 Lead

Lead is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. Lead was used until recently to increase the octane rating in auto fuel. Since gasoline powered automobile engines were a major source of airborne lead through the use of leaded fuels and the use of leaded fuel has been mostly phased out, the ambient concentrations of lead have dropped dramatically.

Exposure to lead occurs mainly through inhalation of air and ingestion of lead in food, water, soil, or dust. It accumulates in the blood, bones, and soft tissues and can adversely affect the kidneys, liver, nervous system, and other organs. Excessive exposure to lead may cause neurological impairments such as seizures, mental retardation, and behavioral disorders. Even at low doses, lead exposure is associated with damage to the nervous systems of fetuses and young children, resulting in learning deficits and lowered IQ. Recent studies also show that lead may be a factor in high blood pressure and subsequent heart disease. Lead can also be deposited on the leaves of plants, presenting a hazard to grazing animals and humans through ingestion (EPA, 2005).

B-6.4 Hydrogen Sulfide

Hydrogen sulfide (H_2S) is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations.

Exposure to low concentrations of hydrogen sulfide may cause irritation to the eyes, nose, or throat. It may also cause difficulty in breathing for some asthmatics. Exposure to higher concentrations (above 100 parts per million [ppm]), can cause olfactory fatigue, respiratory paralysis, and death. Brief exposures to high concentrations of hydrogen sulfide (greater than 500 ppm) can cause a loss of consciousness. In most cases, the person appears to regain consciousness without any other effects. However, in many individuals, there may be permanent or long-term effects such as headaches, poor attention span, poor memory, and poor motor function. No health effects have been found in humans exposed to typical environmental concentrations of hydrogen sulfide (0.00011-0.00033 ppm). Deaths due to breathing in large amounts of hydrogen sulfide have been reported in a variety of different work settings, including sewers, animal processing plants, waste dumps, sludge plants, oil and gas well drilling sites, and tanks and cesspools.

B-6.5 Visibility Reducing Particles

Visibility in important natural areas (e.g., Federal Class I areas) is protected under a number of provisions of the Clean Air Act, including Sections 169A and 169B (addressing impacts primarily from existing sources) and Section 165 (new source review). Visibility impairment is caused by light scattering and light absorption associated with particles and gases in the atmosphere. In most areas of the country, light scattering by PM–2.5 is the most significant component of visibility impairment. The key components of PM–2.5 contributing to visibility impairment include sulfates, nitrates, organic carbon, elemental carbon, and crustal material (US EPA, 2005).

B-6.6 Vinyl Chloride

Vinyl chloride is known also as chloroethene, chloroethylene, ethylene monochloride, or monochloroethylene. At room temperature, it is a colorless gas, it burns easily, and it is not stable at high temperatures. Vinyl chloride exists in liquid form if kept under high pressure or at low temperatures. Vinyl chloride has a mild, sweet odor, which may become noticeable at 3,000 parts vinyl chloride per million parts (ppm) of air. However, the odor is of little value in preventing excess exposure. Most people begin to taste vinyl chloride in water at 3.4 ppm(ATSDR, 2006).

Vinyl chloride is not normally found in urban, suburban, or rural air in amounts that are detectable by the usual methods of analysis. However, vinyl chloride has been found in the air near vinyl chloride manufacturing and processing plants, hazardous waste sites, and landfills. The U.S. Department of Health and Human Services, the International Agency for Research on Cancer, and EPA have each determined that vinyl chloride is a human carcinogen (ATSDR, 2006).

Breathing high levels of vinyl chloride will cause dizziness or sleepiness. These effects occur within 5 minutes if you are exposed to about 10,000 ppm of vinyl chloride. Still higher levels (25,000 ppm) induce unconsciousness and potentially death. Studies in animals show that extremely high levels of vinyl chloride can damage the liver, lungs, and kidneys. These levels also can damage the heart and prevent blood clotting. Some people who have breathed vinyl chloride for several years have changes in the structure of their livers. Some people who have worked with vinyl chloride have nerve damage, and others develop an immune reaction (ATSDR, 2006).

B-6.7 Toxic Air Contaminants

Hazardous air pollutants is a term used by the federal Clean Air Act that includes a variety of pollutants generated or emitted by industrial production activities. Called Toxic Air Contaminants (TAC) under the California Clean Act, ten have been identified through ambient air quality data as being the most substantial health risk in California. Direct exposure to these pollutants has been shown to cause cancer, birth defects, damage to brain and nervous system and respiratory disorders.

TACs do not have ambient air quality standards. Instead, TAC impacts are evaluated by calculating the health risks associated with a given exposure. The requirements of the Air Toxic "Hot Spots" Information and Assessment Act apply to facilities that use, produce, or emit toxic chemicals. Facilities that are subject to the toxic emission inventory requirements of the Act must prepare and submit toxic emission inventory plans and reports, and periodically update those reports.

Health Risks - Nickel
“Nickel occurs naturally in the environment at low levels. Nickel is an essential element in some animal species, and it has been suggested it may be essential for human nutrition. Nickel dermatitis, consisting of itching of the fingers, hands, and forearms, is the most common effect in humans from chronic (long-term) skin contact with nickel. Respiratory effects have also been reported in humans from inhalation exposure to nickel. Human and animal studies have reported an increased risk of lung and nasal cancers from exposure to nickel refinery dusts and nickel subsulfide. Animal studies of soluble nickel compounds (i.e., nickel carbonyl) have reported lung tumors. EPA has classified nickel refinery dust and nickel subsulfide as Group A, human carcinogens, and nickel carbonyl as a Group B2, probable human carcinogen.” (US EPA, 2000).

Health Risks - Diesel Particulate Matter
Diesel particulate matter is emitted from both mobile and stationary sources. In California, on-road diesel fueled engines contribute approximately 24 percent of the statewide total, with an additional 71 percent attributed to

other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units. Stationary sources contribute about 5 percent of total diesel particulate matter.

Diesel exhaust and many individual substances contained in it (including arsenic, benzene, formaldehyde and nickel) have the potential to contribute to mutations in cells that can lead to cancer. Long-term exposure to diesel exhaust particles poses the highest cancer risk of any toxic air contaminant evaluated by the California Office of Environmental Health Hazard Assessment (OEHHA). ARB estimates that about 70 percent of the cancer risk that the average Californian faces from breathing toxic air pollutants stems from diesel exhaust particles (OEHHA and ALA, 2002).

In its comprehensive assessment of diesel exhaust, OEHHA analyzed more than 30 studies of people who worked around diesel equipment, including truck drivers, railroad workers and equipment operators. The studies showed these workers were more likely to develop lung cancer than workers who were not exposed to diesel emissions. These studies provide strong evidence that long-term occupational exposure to diesel exhaust increases the risk of lung cancer. Using information from OEHHA's assessment, ARB estimates that diesel-particle levels measured in California's air in 2000 could cause 540 "excess" cancers (beyond what would occur if there were no diesel particles in the air) in a population of 1 million people over a 70-year lifetime. Other researchers and scientific organizations, including the National Institute for Occupational Safety and Health, have calculated cancer risks from diesel exhaust that are similar to those developed by OEHHA and ARB (OEHHA and ALA, 2002).

Exposure to diesel exhaust can have immediate health effects. Diesel exhaust can irritate the eyes, nose, throat and lungs, and it can cause coughs, headaches, lightheadedness and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks (OEHHA and ALA, 2002).

Diesel engines are a major source of fine-particle pollution. The elderly and people with emphysema, asthma, and chronic heart and lung disease are especially sensitive to fine-particle pollution (see also health effects discussion in Section 4.3.4.5). Numerous studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks and premature deaths among those suffering from respiratory problems. Because children's lungs and respiratory systems are still developing, they are also more susceptible than healthy adults to fine particles. Exposure to fine particles is associated with increased frequency of childhood illnesses and can also reduce lung function in children. In California, diesel exhaust particles have been identified as a carcinogen (OEHHA and ALA, 2002).

Health Risks - Acetaldehyde

Acetaldehyde is both directly emitted into the atmosphere and formed in the atmosphere from photochemical oxidation. Sources include combustion processes such as exhaust from mobile sources and fuel combustion from stationary internal combustion engines, boilers, and process heaters.

Acetaldehyde is classified as a federal hazardous air pollutant and as a California TAC. Acetaldehyde is a carcinogen that also causes chronic non-cancer toxicity in the respiratory system. Symptoms of chronic intoxication of acetaldehyde in humans resemble those of alcoholism. The primary acute effect of inhalation exposure to acetaldehyde is irritation of the eyes, skin, and respiratory tract in humans. At higher exposure levels, erythema, coughing, pulmonary edema, and necrosis may also occur. Acute inhalation of acetaldehyde resulted in a depressed respiratory rate and elevated blood pressure in experimental animals. Tests involving acute exposure of rats, rabbits, and hamsters have demonstrated acetaldehyde to have low acute toxicity from inhalation and moderate acute toxicity from oral or dermal exposure (US EPA, 2000).

Health Risks - Benzene
Approximately 84 percent of the benzene emitted in California comes from motor vehicles, including evaporative leakage and unburned fuel exhaust. Currently, the benzene content of gasoline is less than one percent.

Benzene is highly carcinogenic and occurs throughout California. Benzene also has non-cancer health effects. Brief inhalation exposure to high concentrations can cause central nervous system depression. Acute effects include central nervous system symptoms of nausea, tremors, drowsiness, dizziness, headache, intoxication, and unconsciousness (CalEPA and CARB, 2005).

Neurological symptoms of inhalation exposure to benzene include drowsiness, dizziness, headaches, and unconsciousness in humans. Ingestion of large amounts of benzene may result in vomiting, dizziness, and convulsions in humans. Exposure to liquid and vapor may irritate the skin, eyes, and upper respiratory tract in humans. Redness and blisters may result from dermal exposure to benzene.

Chronic inhalation of certain levels of benzene causes disorders in the blood in humans. Benzene specifically affects bone marrow (the tissues that produce blood cells). Aplastic anemia, excessive bleeding, and damage to the immune system (by changes in blood levels of antibodies and loss of white blood cells) may develop. Increased incidence of leukemia (cancer of the tissues that form white blood cells) has been observed in humans occupationally exposed to benzene (US EPA, 2000).

Health Risks - 1,3 –Butadiene
The majority of 1,3-butadiene emissions come from incomplete combustion of gasoline and diesel fuels. Mobile sources account for 83 percent of total statewide emissions. Area wide sources such as agricultural waste burning and open burning contribute approximately 13 percent of statewide emissions.

1,3-Butadiene has been identified as a carcinogen in California. Butadiene vapors cause neurological effects at very high levels such as blurred vision, fatigue, headache, and vertigo. Dermal exposure of humans to 1,3-butadiene causes a sensation of cold, followed by a burning sensation, which may lead to frostbite (US EPA, 2009).

One epidemiological study reported that chronic (long-term) exposure to 1,3-butadiene via inhalation resulted in an increase in cardiovascular diseases, such as rheumatic and arteriosclerotic heart diseases, while other human studies have reported effects on the blood. A large epidemiological study of synthetic rubber industry workers demonstrated a consistent association between 1,3-butadiene exposure and occurrence of leukemia. Several epidemiological studies of workers in styrene-butadiene rubber factories have shown an increased incidence of respiratory, bladder, stomach, and lymphato-hematopoietic cancers. However, these studies are not sufficient to determine a causal association between 1,3-butadiene exposure and cancer due to possible exposure to other chemicals and other confounding factors(US EPA, 2009).

Health Risks - Carbon Tetrachloride
The primary sources of carbon tetrachloride in California include chemical and allied product manufacturers and petroleum refineries.

In California, carbon tetrachloride has been identified as a carcinogen. Carbon tetrachloride is also a central nervous system depressant and mile eye and respiratory tract irritant. EPA has classified carbon tetrachloride as a Group B2, probable human carcinogen (US EPA, 2000).

Acute inhalation and oral exposures to high levels of carbon tetrachloride have been observed primarily to damage the liver (swollen, tender liver, changes in enzyme levels, and jaundice) and kidneys (nephritis, nephrosis, proteinurea) of humans. Depression of the central nervous system has also been reported. Symptoms of acute exposure in humans include headache, weakness, lethargy, nausea, and vomiting. Delayed pulmonary edema (fluid in lungs) has been observed in humans exposed to high levels of carbon tetrachloride by inhalation and ingestion, but this is believed to be due to injury to the kidney rather than direct action of carbon tetrachloride on the lung. Chronic inhalation or oral exposure to carbon tetrachloride produces liver and kidney damage in humans and animals (US EPA, 2000).

Health Risks - Chromium, Hexavalent

Chromium plating and other metal finishing processes are the primary sources of hexavalent chromium emissions in California. In California, hexavalent chromium has been identified as a carcinogen. There is epidemiological evidence that exposure to inhaled hexavalent chromium may result in lung cancer. The principal acute effects are renal toxicity, gastrointestinal hemorrhage, and intravascular hemolysis (CalEPA and CARB, 2005).

The respiratory tract is the major target organ for chromium (VI) following inhalation exposure in humans. Other effects noted from acute inhalation exposure to very high concentrations of chromium (VI) include gastrointestinal and neurological effects, while dermal exposure causes skin burns in humans. Chronic inhalation exposure to chromium (VI) in humans results in effects on the respiratory tract, with perforations and ulcerations of the septum, bronchitis, decreased pulmonary function, pneumonia, asthma, and nasal itching and soreness reported. Chronic human exposure to high levels of chromium (VI) by inhalation or oral exposure may produce effects on the liver, kidney, gastrointestinal and immune systems, and possibly the blood (US EPA, 2000).

Health Risks - Para-Dichlorobenzene

The primary sources of para-dichlorobenzene include consumer products such as non-aerosol insect repellents and solid/gel air fresheners. These sources contribute 99% of statewide para-dichlorobenzene emissions.

In California, para-dichlorobenzene has been identified as a carcinogen. Acute exposure to 1,4-dichlorobenzene via inhalation in humans results in irritation to the eyes, skin, and throat. In addition, long-term inhalation exposure may affect the liver, skin, and central nervous system in humans (e.g., cerebellar ataxia, dysarthria, weakness in limbs, and hyporeflexia).(CalEPA and CARB, 2005); (US EPA, 2000).

Health Risks - Formaldehyde

Formaldehyde is both directly emitted into the atmosphere and formed in the atmosphere as a result of photochemical oxidation. Formaldehyde is a product of incomplete combustion. One of the primary sources of formaldehyde is vehicular exhaust. Formaldehyde is also used in resins, can be found in many consumer products as an antimicrobial agent, and is used in fumigants and soil disinfectants.

The major toxic effects caused by acute formaldehyde exposure via inhalation are eye, nose, and throat irritation and effects on the nasal cavity. Other effects seen from exposure to high levels of formaldehyde in humans are coughing, wheezing, chest pains, and bronchitis. Chronic exposure to formaldehyde by inhalation in humans has been associated with respiratory symptoms and eye, nose, and throat irritation. Animal studies have reported effects on the nasal respiratory epithelium and lesions in the respiratory system from chronic inhalation exposure to formaldehyde. Occupational studies have noted statistically significant associations between exposure to formaldehyde and increased incidence of lung and nasopharyngeal cancer. This evidence is considered to be "limited," rather than "sufficient," due to possible exposure to other agents that may have contributed to the excess cancers. EPA considers formaldehyde to be a probable human carcinogen (cancer-causing agent) and has ranked it in EPA's Group B1. In California, formaldehyde has been identified as a carcinogen. (CalEPA and CARB, 2005); (US EPA, 2000).

Health Risks - Methylene Chloride

Methylene chloride is used as a solvent, a blowing and cleaning agent in the manufacture of polyurethane foam and plastic manufacture, and as a solvent in paint stripping operations. Paint removers account for the largest use of methylene chloride in California.

Case studies of methylene chloride poisoning during paint stripping operations have demonstrated that inhalation exposure to extremely high levels can be fatal to humans. Acute inhalation exposure to high levels of methylene chloride in humans has resulted in effects on the central nervous system (CNS) including decreased visual, auditory, and psychomotor functions, but these effects are reversible once exposure ceases. Methylene chloride also irritates the nose and throat at high concentrations. The major effects from chronic inhalation exposure to methylene chloride in humans are effects on the central nervous system, such as headaches, dizziness, nausea, and memory loss. In addition, chronic exposure can lead to bone marrow, hepatic, and renal toxicity. EPA considers methylene chloride to be a probable human carcinogen and has ranked it in EPA's Group B2. California considers methylene chloride to be carcinogenic. (US EPA, 2000).

Health Risks - Perchloroethylene

Perchloroethylene is used as a solvent, primarily in dry cleaning operations. Perchloroethylene is also used in degreasing operations, paints and coatings, adhesives, aerosols, specialty chemical production, printing inks, silicones, rug shampoos, and laboratory solvents.

In California, perchloroethylene has been identified as a carcinogen. Perchloroethylene vapors are irritating to the eyes and respiratory tract. Following chronic exposure, workers have shown signs of liver toxicity, as well as kidney dysfunction, and neurological disorders (CalEPA and CARB, 2005).

Appendix C: Ambient Pollutant Concentrations

Ozone Trends Summary: Hesperia-Olive Street

	Days > Standard				1-Hour Observations			8-Hour Averages				
	State		National			State	*Nat'l*	State		National		Year
Year	1-Hr	8-Hr	*1-Hr*	'08 8-Hr	Max.	D.V.[1]	*D.V.[2]*	Max.	D.V.[1]	Max.	'08 D.V.[2]	Coverage
2014	8	40	*0*	27	0.121	0.11	*0.111*	0.094	0.097	0.093	0.087	100
2013	1	35	*0*	12	0.100	0.11	*0.117*	0.085	0.102	0.084	0.091	98
2012	21	93	*0*	55	0.116	0.12	*0.118*	0.097	0.102	0.097	0.095	100
2011	24	101	*1*	67	0.132	0.12	*0.119*	0.114	0.102	0.113	0.097	100
2010	15	66	*0*	42	0.119	0.12	*0.121*	0.102	0.107	0.101	0.096	100
2009	18	64	*0*	40	0.123	0.12	*0.123*	0.101	0.110	0.101	0.097	100
2008	29	80	*1*	58	0.132	0.12	*0.132*	0.107	0.107	0.106	0.097	99
2007	24	75	*2*	47	0.132	0.13	*0.133*	0.110	0.113	0.109	0.099	94
2006	22	76	*2*	50	0.148	0.13	*0.134*	0.125	0.113	0.124	0.099	100
2005	41	89	*3*	67	0.140	0.13	*0.136*	0.121	0.119	0.120	0.104	99
2004	28	67	*2*	53	0.138	0.13	*0.138*	0.119	0.120	0.119	0.107	100
2003	43	93	*2*	70	0.163	0.13	*0.136*	0.131	0.119	0.130	0.106	100
2002	46	107	*5*	73	0.147	0.14	*0.143*	0.123	0.120	0.123	0.106	99
Graph												

Info: Click on a column header for more information about the statistic in that column.

Area: San Bernardino County; Mojave Desert Air Basin;
Antelope Valley & W Mojave Desert 8-Hr Ozone Plan Area

District: Mojave Desert AQMD

Years: Annual Ozone statistics are available for this site from 1985 through 2014.

Notes: All concentrations expressed in parts per million.

The national 1-hour ozone standard was revoked in June 2005 and is no longer in effect. Statistics related to the revoked standard are shown in *italics* or *italics* .

State exceedances shown in yellow . National exceedances shown in **orange** .

An exceedance is not necessarily a violation.

[1] D.V. = State Designation Value

[2] D.V. = National Design Value

* There was insufficient (or no) data available to determine the value.

Go to: **Data Statistics Home Page** | **Trends Summaries Start Page** | **PM10 Trends for this Site**

California Environmental Protection Agency
Air Resources Board

Top 4 Summary: Highest 4 Daily Maximum 8-Hour Ozone Averages

at Hesperia-Olive Street

iADAM

	2009		2010		2011	
	Date	8-Hr Average	Date	8-Hr Average	Date	8-Hr Average
National:						
First High:	Jul 21	0.101	Jun 23	0.101	Jul 2	0.113
Second High:	Sep 4	0.098	Jun 24	0.101	Jun 27	0.102
Third High:	Aug 30	0.097	Jul 17	0.098	Jul 7	0.101
Fourth High:	Jul 28	0.096	Jun 30	0.095	Aug 18	0.100
California:						
First High:	Jul 21	0.101	Jun 23	0.102	Jul 2	0.114
Second High:	Sep 4	0.099	Jun 24	0.102	Jun 27	0.102
Third High:	Aug 30	0.098	Jul 17	0.099	Jul 7	0.102
Fourth High:	Jul 28	0.097	Jun 30	0.096	Aug 18	0.101
National:						
# Days Above the Standard:		40		42		67
Nat'l Standard Design Value:		0.097		0.096		0.097
National Year Coverage:		100		100		100
California:						
# Days Above the Standard:		64		66		101
California Designation Value:		0.110		0.107		0.102
Expected Peak Day Concentration:		0.110		0.107		0.108
California Year Coverage:		100		99		100

Notes:

Eight-hour ozone averages and related statistics are available at Hesperia-Olive Street between 1985 and 2014. Some years in this range may not be represented.

All averages expressed in parts per million.

An exceedance of a standard is not necessarily related to a violation of the standard.

Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.

* means there was insufficient data available to determine the value.

Available Pollutants:

8-Hour Ozone | Hourly Ozone | PM2.5 | PM10 | Carbon Monoxide | Nitrogen Dioxide | State Sulfur Dioxide | Hydrogen Sulfide

California Environmental Protection Agency
Air Resources Board

Top 4 Summary: Highest 4 Daily Maximum 8-Hour Ozone Averages

at Hesperia-Olive Street

	2012		2013		2014	
	Date	8-Hr Average	Date	8-Hr Average	Date	8-Hr Average
National:						
First High:	Jul 11	0.097	May 4	0.084	May 16	0.093
Second High:	Jun 20	0.096	May 21	0.084	May 17	0.092
Third High:	May 12	0.093	Jul 19	0.084	Jun 5	0.088
Fourth High:	Jun 2	0.092	May 30	0.083	Jul 25	0.087
California:						
First High:	Jul 11	0.097	May 4	0.085	May 16	0.094
Second High:	Jun 20	0.096	May 21	0.085	May 17	0.092
Third High:	May 12	0.094	Jul 19	0.085	Jun 5	0.089
Fourth High:	Jun 2	0.092	May 30	0.084	Jul 25	0.088
National:						
# Days Above the Standard:		55		12		27
Nat'l Standard Design Value:		0.095		0.091		0.087
National Year Coverage:		100		98		100
California:						
# Days Above the Standard:		93		35		40
California Designation Value:		0.102		0.102		0.097
Expected Peak Day Concentration:		0.106		0.103		0.100
California Year Coverage:		100		98		100

Notes:

Eight-hour ozone averages and related statistics are available at Hesperia-Olive Street between 1985 and 2014. Some years in this range may not be represented.
All averages expressed in parts per million.
An exceedance of a standard is not necessarily related to a violation of the standard.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
* means there was insufficient data available to determine the value.

Available Pollutants:

8-Hour Ozone | Hourly Ozone | PM2.5 | PM10 | Carbon Monoxide | Nitrogen Dioxide | State Sulfur Dioxide | Hydrogen Sulfide

California Environmental Protection Agency
Air Resources Board

Top 4 Summary: Highest 4 Daily Maximum Hourly Ozone Measurements

at Hesperia-Olive Street

iADAM

	2009		2010		2011	
	Date	Measurement	Date	Measurement	Date	Measurement
First High:	Aug 31	0.123	Jul 15	0.119	Jul 2	*0.132*
Second High:	Jul 21	0.122	Jul 16	0.115	Jul 1	0.119
Third High:	Aug 30	0.117	Jul 17	0.115	Jun 27	0.118
Fourth High:	Sep 2	0.112	Jun 24	0.114	Jul 3	0.117
California:						
# Days Above the Standard:		18		15		24
California Designation Value:		0.12		0.12		0.12
Expected Peak Day Concentration:		0.123		0.120		0.120
National:						
# Days Above the Standard:		*0*		*0*		*1*
Nat'l Standard Design Value:		*0.123*		*0.121*		*0.119*
Year Coverage:		100		100		100

Notes:

Hourly ozone measurements and related statistics are available at Hesperia-Olive Street between 1985 and 2014. Some years in this range may not be represented.

All concentrations expressed in parts per million.

The national 1-hour ozone standard was revoked in June 2005 and is no longer in effect. Statistics related to the revoked standard are shown in *italics* or *italics* .

An exceedance of a standard is not necessarily related to a violation of the standard.

Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.

* means there was insufficient data available to determine the value.

Available Pollutants:

8-Hour Ozone | Hourly Ozone | PM2.5 | PM10 | Carbon Monoxide | Nitrogen Dioxide | State Sulfur Dioxide | Hydrogen Sulfide

California Environmental Protection Agency
Air Resources Board

Top 4 Summary: Highest 4 Daily Maximum Hourly Ozone Measurements

at Hesperia-Olive Street

iADAM

	2012		2013		2014	
	Date	Measurement	Date	Measurement	Date	Measurement
First High:	Aug 13	0.116	Jul 3	0.100	May 17	0.121
Second High:	Aug 16	0.111	May 4	0.094	May 16	0.111
Third High:	Aug 2	0.110	Jul 4	0.093	Jul 25	0.099
Fourth High:	Jul 11	0.105	May 21	0.092	Jun 24	0.097
California:						
# Days Above the Standard:		21		1		8
California Designation Value:		0.12		0.11		0.11
Expected Peak Day Concentration:		0.117		0.114		0.107
National:						
# Days Above the Standard:		*0*		*0*		*0*
Nat'l Standard Design Value:		*0.118*		*0.117*		*0.111*
Year Coverage:		100		98		100

Notes:

Hourly ozone measurements and related statistics are available at Hesperia-Olive Street between 1985 and 2014. Some years in this range may not be represented.

All concentrations expressed in parts per million.

The national 1-hour ozone standard was revoked in June 2005 and is no longer in effect. Statistics related to the revoked standard are shown in *italics* or *italics* .

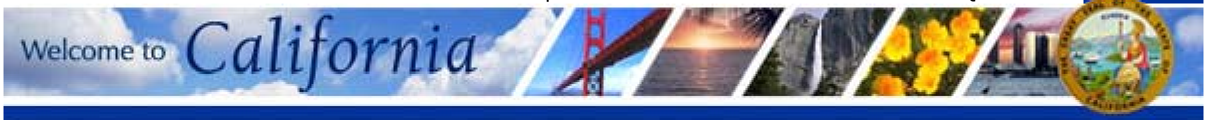
An exceedance of a standard is not necessarily related to a violation of the standard.

Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.

* means there was insufficient data available to determine the value.

Available Pollutants:

8-Hour Ozone | Hourly Ozone | PM2.5 | PM10 | Carbon Monoxide | Nitrogen Dioxide | State Sulfur Dioxide | Hydrogen Sulfide



Air Resources Board

iADAM FAQs

PM2.5 Trends Summary: Big Bear City-501 W. Valley Blvd

Year	Est. Days > Nat'l '06 Std.	Annual Average Nat'l	Annual Average State	Nat'l Ann. Std. D.V.[1]	State Annual D.V.[2]	Nat'l '06 Std. 98th Percentile	Nat'l '06 24-Hr Std. D.V.[1]	High 24-Hour Average Nat'l	High 24-Hour Average State	Year Coverage
2014	*	*	*	*	10	*	*	24.2	24.2	81
2013	5.8	9.7	9.7	*	10	35.1	*	35.5	35.5	94
2012	*	*	*	*	*	*	*	36.4	36.4	95
2011	0.0	8.4	*	*	10	30.6	*	30.7	30.7	91
2010	*	*	*	*	10	*	*	35.4	35.4	76
2009	6.6	9.9	9.9	*	10	29.4	32	40.7	40.7	90
2008	5.7	9.1	*	*	*	33.2	36	36.7	36.7	84
2007	*	*	*	*	*	34.0	38	45.4	45.4	95
2006	*	*	*	*	*	40.0	*	40.0	40.0	84
2005	*	*	*	*	*	38.7	*	38.7	38.7	90
2004	*	*	*	*	*	*	*	28.6	28.6	75
2003	0.0	10.6	*	*	*	28.8	*	35.0	35.0	92
2002	*	*	*	*	*	*	*	34.1	34.1	83
Graph										

Info: Click on a column header for more information about the statistic in that column.

Area: San Bernardino County; South Coast Air Basin;
South Coast Air Basin 8-Hour Ozone Planning Area

District: South Coast AQMD

Years: Annual PM2.5 statistics are available for this site from 1999 through 2014.

Notes: All concentrations expressed in micrograms per cubic meter.
State exceedances shown in yellow . National exceedances shown in **orange** .
An exceedance is not necessarily a violation.
State and national statistics may differ for the following reasons:
State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers.
State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
[1] D.V. = National Design Value
[2] D.V. = State Designation Value
* There was insufficient (or no) data available to determine the value.

Go to: **Data Statistics Home Page** **Trends Summaries Start Page**

California Environmental Protection Agency
Air Resources Board

Top 4 Summary: Highest 4 Daily 24-Hour PM2.5 Averages

at Big Bear City-501 W. Valley Blvd

iADAM

	2009		2010		2011	
	Date	24-Hr Average	Date	24-Hr Average	Date	24-Hr Average
National:						
First High:	Dec 27	40.7	Jan 2	35.4	Dec 11	30.7
Second High:	Jan 19	29.4	Jan 8	27.5	Dec 29	30.6
Third High:	Jan 31	26.7	Dec 4	21.0	Nov 23	28.2
Fourth High:	Jan 7	23.5	Nov 16	18.4	Jan 21	27.0
California:						
First High:	Dec 27	40.7	Jan 2	35.4	Dec 11	30.7
Second High:	Jan 19	29.4	Jan 8	27.5	Dec 29	30.6
Third High:	Jan 31	26.7	Dec 4	21.0	Nov 23	28.2
Fourth High:	Jan 7	23.5	Nov 16	18.4	Jan 21	27.0
National:						
Estimated # Days > 24-Hour Std:		6.6		*		0.0
Measured # Days > 24-Hour Std:		1		0		0
24-Hour Standard Design Value:		32		*		*
24-Hour Standard 98th Percentile:		29.4		*		30.6
Annual Standard Design Value:		*		*		*
Annual Average:		9.8		*		8.4
California:						
Annual Std Designation Value:		10		10		10
Annual Average:		9.9		*		*
Year Coverage:		90		76		91

Notes:

Daily PM2.5 averages and related statistics are available at Big Bear City-501 W. Valley Blvd between 1999 and 2014. Some years in this range may not be represented.
All averages expressed in micrograms per cubic meter.
An exceedance of a standard is not necessarily related to a violation of the standard.
State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
* means there was insufficient data available to determine the value.

Available Pollutants:

8-Hour Ozone | Hourly Ozone | PM2.5 | PM10 | Carbon Monoxide | Nitrogen Dioxide | State Sulfur Dioxide | Hydrogen Sulfide

California Environmental Protection Agency
Air Resources Board

Top 4 Summary: Highest 4 Daily 24-Hour PM2.5 Averages

at Big Bear City-501 W. Valley Blvd

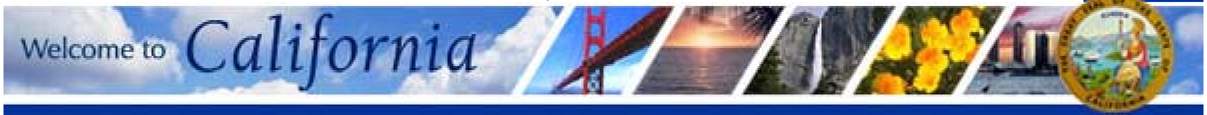
	2012		2013		2014	
	Date	24-Hr Average	Date	24-Hr Average	Date	24-Hr Average
National:						
First High:	Nov 23	36.4	Nov 30	35.5	Jan 5	24.2
Second High:	Nov 11	27.4	Jan 4	35.1	Feb 22	19.1
Third High:	Jan 4	18.0	Dec 30	25.8	Jan 17	17.7
Fourth High:	Jan 10	15.3	Nov 6	21.8	Jan 23	15.5
California:						
First High:	Nov 23	36.4	Nov 30	35.5	Jan 5	24.2
Second High:	Nov 11	27.4	Jan 4	35.1	Feb 22	19.1
Third High:	Jan 4	18.0	Dec 30	25.8	Jan 17	17.7
Fourth High:	Jan 10	15.3	Nov 6	21.8	Jan 23	15.5
National:						
Estimated # Days > 24-Hour Std:		*		5.8		*
Measured # Days > 24-Hour Std:		1		1		0
24-Hour Standard Design Value:		*		*		*
24-Hour Standard 98th Percentile:		*		35.1		*
Annual Standard Design Value:		*		*		*
Annual Average:		*		9.6		*
California:						
Annual Std Designation Value:		*		10		10
Annual Average:		*		9.7		*
Year Coverage:		95		94		81

Notes:

Daily PM2.5 averages and related statistics are available at Big Bear City-501 W. Valley Blvd between 1999 and 2014. Some years in this range may not be represented.
All averages expressed in micrograms per cubic meter.
An exceedance of a standard is not necessarily related to a violation of the standard.
State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
* means there was insufficient data available to determine the value.

Available Pollutants:

8-Hour Ozone | Hourly Ozone | PM2.5 | PM10 | Carbon Monoxide | Nitrogen Dioxide | State Sulfur Dioxide | Hydrogen Sulfide



Air Resources Board

iADAM

PM10 Trends Summary: Lucerne Valley-Middle School

FAQs

Year	Est. Days > Std. Nat'l	Est. Days > Std. State	Annual Average *Nat'l*	Annual Average State	3-Year Average *Nat'l*	3-Year Average State	High 24-Hr Average Nat'l	High 24-Hr Average State	Year Coverage
2014	*	*	*16.7*	*	*16*	*	49.8	44.6	86
2013	*	*	*18.5*	*	*15*	*	160.2	142.8	74
2012	0.0	*	*13.9*	*	*14*	13	30.0	27.0	89
2011	*	*	*13.8*	*	*15*	15	33.0	31.0	93
2010	0.0	0.0	*14.6*	13.4	*18*	15	43.0	38.0	99
2009	0.0	6.1	*17.3*	15.4	*23*	28	93.0	81.0	99
2008	*	*	*20.7*	*	*25*	28	67.0	62.0	76
2007	6.1	36.6	*31.0*	27.8	*24*	28	229.0	212.0	100
2006	0.0	*	*23.0*	*	*20*	17	56.0	50.0	97
2005	0.0	6.1	*19.1*	16.9	*19*	17	64.0	57.0	100
2004	0.0	*	*18.1*	*	*19*	17	53.0	47.0	95
2003	0.0	6.5	*19.7*	17.4	*19*	17	79.0	75.0	97
2002	0.0	*	*19.2*	*	*20*	23	46.0	46.0	94
Graph									

Info: Click on a column header for more information about the statistic in that column.

Area: San Bernardino County; Mojave Desert Air Basin;
Antelope Valley & W Mojave Desert 8-Hr Ozone Plan Area

District: Mojave Desert AQMD

Years: Annual PM10 statistics are available for this site from 1990 through 2014.

Notes: All concentrations expressed in micrograms per cubic meter.

The national annual average PM10 standard was revoked in December 2006 and is no longer in effect.
Statistics related to the revoked standard are shown in *italics* or *italics* .

State exceedances shown in **yellow** . National exceedances shown in **orange** .

An exceedance is not necessarily a violation.

Statistics may include data that are related to an exceptional event.

State and national statistics may differ for the following reasons:

State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods.
State and national statistics may therefore be based on different samplers.

State statistics for 1998 and later are based on *local* conditions (except for sites in the South Coast Air Basin, where State statistics for 2002 and later are based on *local* conditions).
National statistics are based on *standard* conditions.

State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

* There was insufficient (or no) data available to determine the value.

Go to: **Data Statistics Home Page** **Trends Summaries Start Page**

California Environmental Protection Agency
Air Resources Board

Top 4 Summary: Highest 4 Daily 24-Hour PM10 Averages

at Lucerne Valley-Middle School

	2009		2010		2011	
	Date	24-Hr Average	Date	24-Hr Average	Date	24-Hr Average
National:						
First High:	Jul 24	93.0	Sep 5	43.0	Apr 15	33.0
Second High:	Oct 4	39.0	Sep 17	39.0	May 27	33.0
Third High:	Sep 4	38.0	Jun 13	32.0	Feb 8	29.0
Fourth High:	Aug 11	35.0	Sep 11	28.0	Jul 8	27.0
California:						
First High:	Jul 24	81.0	Sep 5	38.0	Apr 15	31.0
Second High:	Oct 4	35.0	Sep 17	35.0	May 27	30.0
Third High:	Sep 4	33.0	Jun 13	28.0	Feb 8	27.0
Fourth High:	Aug 11	31.0	Sep 11	25.0	Jul 8	24.0
National:						
Estimated # Days > 24-Hour Std:		0.0		0.0		*
Measured # Days > 24-Hour Std:		0		0		0
3-Yr Avg Est # Days > 24-Hr Std:		*		*		*
Annual Average:		*17.3*		*14.6*		*13.8*
3-Year Average:		*23*		*18*		*15*
California:						
Estimated # Days > 24-Hour Std:		6.1		0.0		*
Measured # Days > 24-Hour Std:		1		0		0
Annual Average:		15.4		13.4		*
3-Year Maximum Annual Average:		28		15		15
Year Coverage:		99		99		93

Notes:

- Daily PM10 averages and related statistics are available at Lucerne Valley-Middle School between 1990 and 2014. Some years in this range may not be represented.
- All averages expressed in micrograms per cubic meter.
- The national annual average PM10 standard was revoked in December 2006 and is no longer in effect. Statistics related to the revoked standard are shown in *italics* or *italics* .
- An exceedance of a standard is not necessarily related to a violation of the standard.
- All values listed above represent midnight-to-midnight 24-hour averages and may be related to an exceptional event.
- State and national statistics may differ for the following reasons:
  - State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers.
  - State statistics for 1998 and later are based on local conditions (except for sites in the South Coast Air Basin, where State statistics for 2002 and later are based on local conditions). National statistics are based on standard conditions.
  - State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
- Measurements are usually collected every six days. Measured days counts the days that a measurement was greater than the level of the standard; Estimated days mathematically estimates how many days concentrations would have been greater than the level of the standard had each day been monitored.
- 3-Year statistics represent the listed year and the 2 years before the listed year.
- Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
- * means there was insufficient data available to determine the value.

Available Pollutants:

8-Hour Ozone | Hourly Ozone | PM2.5 | PM10 | Carbon Monoxide | Nitrogen Dioxide | State Sulfur Dioxide | Hydrogen Sulfide

California Environmental Protection Agency
Air Resources Board

Top 4 Summary: Highest 4 Daily 24-Hour PM10 Averages

at Lucerne Valley-Middle School

	2012		2013		2014	
	Date	24-Hr Average	Date	24-Hr Average	Date	24-Hr Average
National:						
First High:	Sep 12	30.0	Jun 3	160.2	Aug 21	49.8
Second High:	Jun 8	28.0	May 4	71.4	May 11	35.8
Third High:	May 9	26.0	May 16	70.3	Oct 8	31.7
Fourth High:	May 21	26.0	Jul 15	50.2	Apr 17	30.3
California:						
First High:	Sep 12	27.0	Jun 3	142.8	Aug 21	44.6
Second High:	Jun 8	25.0	May 4	64.5	May 11	33.0
Third High:	May 9	23.0	May 16	63.9	Oct 8	28.5
Fourth High:	May 21	23.0	Jul 15	44.2	Apr 17	27.4

	2012	2013	2014
National:			
Estimated # Days > 24-Hour Std:	0.0	*	*
Measured # Days > 24-Hour Std:	0	1	0
3-Yr Avg Est # Days > 24-Hr Std:	*	*	*
Annual Average:	*13.9*	*18.5*	*16.7*
3-Year Average:	*14*	*15*	*16*
California:			
Estimated # Days > 24-Hour Std:	*	*	*
Measured # Days > 24-Hour Std:	0	3	0
Annual Average:	*	*	*
3-Year Maximum Annual Average:	13	*	*
Year Coverage:	89	74	86

Notes:

Daily PM10 averages and related statistics are available at Lucerne Valley-Middle School between 1990 and 2014. Some years in this range may not be represented.
All averages expressed in micrograms per cubic meter.
The national annual average PM10 standard was revoked in December 2006 and is no longer in effect. Statistics related to the revoked standard are shown in *italics* or *italics* .
An exceedance of a standard is not necessarily related to a violation of the standard.
All values listed above represent midnight-to-midnight 24-hour averages and may be related to an exceptional event.
State and national statistics may differ for the following reasons:
State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers.
State statistics for 1998 and later are based on local conditions (except for sites in the South Coast Air Basin, where State statistics for 2002 and later are based on local conditions). National statistics are based on standard conditions.
State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
Measurements are usually collected every six days. Measured days counts the days that a measurement was greater than the level of the standard; Estimated days mathematically estimates how many days concentrations would have been greater than the level of the standard had each day been monitored.
3-Year statistics represent the listed year and the 2 years before the listed year.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
* means there was insufficient data available to determine the value.

Available Pollutants:

8-Hour Ozone | Hourly Ozone | PM2.5 | PM10 | Carbon Monoxide | Nitrogen Dioxide | State Sulfur Dioxide | Hydrogen Sulfide

California Environmental Protection Agency
Air Resources Board

Top 4 Summary: Highest 4 Daily Maximum 8-Hour Carbon Monoxide Averages

at Victorville-14306 Park Avenue

iADAM

	2009		2010		2011	
	Date	8-Hr Average	Date	8-Hr Average	Date	8-Hr Average
National:						
First High:	Jan 31	1.14	Jun 27	5.17	Nov 29	1.51
Second High:	Jan 7	1.07	Jun 29	4.26	Dec 25	1.50
Third High:	Jan 7	1.05	Jan 25	1.60	Dec 28	1.50
Fourth High:	Jan 11	1.01	Jun 28	1.52	Dec 24	1.48
California:						
First High:	Jan 30	1.14	Jun 27	5.17	Nov 28	1.51
Second High:	Jan 6	1.07	Jun 28	4.26	Dec 24	1.50
Third High:	Jan 7	1.05	Jan 24	1.60	Dec 27	1.50
Fourth High:	Jan 1	1.01	Jan 31	1.48	Dec 6	1.44
National:						
# Days Above the Standard:		0		0		0
California:						
# Days Above the Standard:		0		0		0
Expected Peak Day Concentration:		1.24		1.64		1.98
Year Coverage:		99		96		93

Notes:

Eight-hour carbon monoxide averages and related statistics are available at Victorville-14306 Park Avenue between 2000 and 2012. Some years in this range may not be represented.

All averages expressed in parts per million.

An exceedance of a standard is not necessarily related to a violation of the standard.

Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.

* means there was insufficient data available to determine the value.

Available Pollutants:

8-Hour Ozone | Hourly Ozone | PM2.5 | PM10 | Carbon Monoxide | Nitrogen Dioxide | State Sulfur Dioxide | Hydrogen Sulfide

California Environmental Protection Agency
Air Resources Board

Top 4 Summary: Highest 4 Daily Maximum 8-Hour Carbon Monoxide Averages

at Victorville-14306 Park Avenue

	2012		2013		2014	
	Date	8-Hr Average	Date	8-Hr Average	Date	8-Hr Average
National:						
First High:	Jan 15	1.83		*		*
Second High:	Jan 13	1.52		*		*
Third High:	Jan 3	1.44		*		*
Fourth High:	Jan 14	1.44		*		*
California:						
First High:	Jan 14	1.83		*		*
Second High:	Jan 13	1.52		*		*
Third High:	Jan 2	1.44		*		*
Fourth High:	Jan 19	1.41		*		*
National:						
# Days Above the Standard:		0		0		0
California:						
# Days Above the Standard:		0		0		0
Expected Peak Day Concentration:		2.17				
Year Coverage:		51		*		*

Notes:

Eight-hour carbon monoxide averages and related statistics are available at Victorville-14306 Park Avenue between 2000 and 2012. Some years in this range may not be represented.
All averages expressed in parts per million.
An exceedance of a standard is not necessarily related to a violation of the standard.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
* means there was insufficient data available to determine the value.

Available Pollutants:
8-Hour Ozone | Hourly Ozone | PM2.5 | PM10 | Carbon Monoxide | Nitrogen Dioxide | State Sulfur Dioxide | Hydrogen Sulfide

California Environmental Protection Agency
Air Resources Board

Top 4 Summary: Highest 4 Daily Maximum Hourly Nitrogen Dioxide Measurements

at Victorville-14306 Park Avenue

	2009		2010		2011	
	Date	Measurement	Date	Measurement	Date	Measurement
National:						
First High:	Jun 25	64.0	Oct 9	137.0	Oct 31	75.0
Second High:	May 11	60.0	Oct 16	131.0	May 5	70.0
Third High:	Aug 13	60.0	Oct 8	85.0	Oct 13	68.0
Fourth High:	Aug 17	60.0	Oct 20	81.0	Aug 26	65.0
California:						
First High:	Jun 25	64	Oct 9	137	Oct 31	75
Second High:	May 11	60	Oct 16	131	May 5	70
Third High:	Aug 13	60	Oct 8	85	Oct 13	68
Fourth High:	Aug 17	60	Oct 20	81	Aug 26	65
National:						
1-Hour Standard Design Value:		62		63		61
1-Hour Standard 98th Percentile:		59.0		65.0		60.0
# Days Above the Standard:		0		2		0
Annual Standard Design Value:		15		15		15
California:						
1-Hour Std Designation Value:		70		80		80
Expected Peak Day Concentration:		74		78		76
# Days Above the Standard:		0		0		0
Annual Std Designation Value:		18		16		15
Annual Average:		15		15		15
Year Coverage:		98		99		100

Notes:

Hourly nitrogen dioxide measurements and related statistics are available at Victorville-14306 Park Avenue between 2000 and 2014. Some years in this range may not be represented.

All concentrations expressed in parts per billion.

An exceedance of a standard is not necessarily related to a violation of the standard.

Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.

* means there was insufficient data available to determine the value.

Available Pollutants:

8-Hour Ozone | Hourly Ozone | PM2.5 | PM10 | Carbon Monoxide | Nitrogen Dioxide | State Sulfur Dioxide | Hydrogen Sulfide

California Environmental Protection Agency
Air Resources Board

Top 4 Summary: Highest 4 Daily Maximum Hourly Nitrogen Dioxide Measurements

at Victorville-14306 Park Avenue

	2012		2013		2014	
	Date	Measurement	Date	Measurement	Date	Measurement
National:						
First High:	Jan 20	56.0	Nov 8	64.6	Jul 31	66.6
Second High:	Oct 30	55.0	Feb 12	61.0	Apr 9	60.7
Third High:	Jun 12	51.0	Apr 29	60.1	Sep 12	56.3
Fourth High:	Oct 29	51.0	Feb 13	57.4	Oct 24	53.3
California:						
First High:	Jan 20	56	Nov 8	64	Jul 31	66
Second High:	Oct 30	55	Feb 12	61	Apr 9	60
Third High:	Jun 12	51	Apr 29	60	Sep 12	56
Fourth High:	Oct 29	51	Feb 13	57	May 16	53
National:						
1-Hour Standard Design Value:		58		55		53
1-Hour Standard 98th Percentile:		50.0		55.7		52.7
# Days Above the Standard:		0		0		0
Annual Standard Design Value:		13		14		13
California:						
1-Hour Std Designation Value:		80		70		60
Expected Peak Day Concentration:		75		65		61
# Days Above the Standard:		0		0		0
Annual Std Designation Value:		15		15		14
Annual Average:		13		14		13
Year Coverage:		99		99		99

Notes:

Hourly nitrogen dioxide measurements and related statistics are available at Victorville-14306 Park Avenue between 2000 and 2014. Some years in this range may not be represented.

All concentrations expressed in parts per billion.

An exceedance of a standard is not necessarily related to a violation of the standard.

Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.

* means there was insufficient data available to determine the value.

Available Pollutants:

8-Hour Ozone | Hourly Ozone | PM2.5 | PM10 | Carbon Monoxide | Nitrogen Dioxide | State Sulfur Dioxide | Hydrogen Sulfide

Monitor Values Report

Geographic Area: San Bernardino County, CA
Pollutant: SO_2
Year: 2009
Exceptional Events: Included (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs 1hr	First Max 1hr	Second Max 1hr	99th Percentile	Obs 24hr	First Max 24hr	Second Max 24hr	Days >STD	Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8343	8	7	6	364	5.5	5	0	0.68	None	1	060710306	14306 Park Ave., Victorville, Ca	Victorville	San Bernardino	CA	09
8332	11	10	9	359	2.8	2.4	0	0.62	None	1	060711234	Corner Of Athol And Telescope	Searles Valley	San Bernardino	CA	09
8271	5	4	4	362	2	1.8	0	0.87	None	1	060712002	14360 Arrow Blvd., Fontana	Fontana	San Bernardino	CA	09

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. <http://www.epa.gov/airquality/airdata/ad_contacts.html>

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: December 29, 2015

Monitor Values Report

Geographic Area: San Bernardino County, CA
Pollutant: SO2
Year: 2010
Exceptional Events: Included (if any)

Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs 1hr	First Max 1hr	Second Max 1hr	99th Percentile	Obs 24hr	First Max 24hr	Second Max 24hr	Days >STD	Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8224	52	16	11	361	7.2	6.7	0	0.92	None	1	060710306	14306 Park Ave., Victorville, Ca	Victorville	San Bernardino	CA	09
8148	10	10	8	355	3.2	3.1	0	1.23	None	1	060711234	Corner Of Athol And Telescope	Searles Valley	San Bernardino	CA	09
5503	6.6	4.9	3	242	1.6	1.5	0	0.65*	None	1	060712002	14360 Arrow Blvd., Fontana	Fontana	San Bernardino	CA	09

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems.
<http://www.epa.gov/airquality/airdata/ad_contacts.html>

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: December 29, 2015

Monitor Values Report

Geographic Area: San Bernardino County, CA
Pollutant: SO_2
Year: 2011
Exceptional Events: Included (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs 1hr	First Max 1hr	Second Max 1hr	99th Percentile	Obs 24hr	First Max 24hr	Second Max 24hr	Days >STD	Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8340	13	9	7	362	7	7	0	1.44	None	1	060710306	14306 Park Ave., Victorville, Ca	Victorville	San Bernardino	CA	09
7867	14	12	11	341	6.2	6.2	0	1.55	None	1	060711234	Corner Of Athol And Telescope	Searles Valley	San Bernardino	CA	09
7585	12.3	9.4	7	339	3.1	3.1	0	0.62	None	1	060712002	14360 Arrow Blvd., Fontana	Fontana	San Bernardino	CA	09

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. <http://www.epa.gov/airquality/airdata/ad_contacts.html>

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: December 29, 2015

Monitor Values Report

Geographic Area: San Bernardino County, CA
Pollutant: SO_2
Year: 2012
Exceptional Events: Included (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs 1hr	First Max 1hr	Second Max 1hr	99th Percentile	Obs 24hr	First Max 24hr	Second Max 24hr	Days >STD	Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8324	6	5	5	362	2.7	2.1	0	0.95	None	1	060710306	14306 Park Ave., Victorville, Ca	Victorville	San Bernardino	CA	09
4193	12	11	11	181	2.5	2.5	0	0.62*	None	1	060711234	Corner Of Athol And Telescope	Searles Valley	San Bernardino	CA	09
8113	4	4	4	355	3.2	3.2	0	0.64	None	1	060712002	14360 Arrow Blvd., Fontana	Fontana	San Bernardino	CA	09

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. <http://www.epa.gov/airquality/airdata/ad_contacts.html>

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: December 29, 2015

Monitor Values Report

Geographic Area: San Bernardino County, CA
Pollutant: SO_2
Year: 2013
Exceptional Events: Included (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs 1hr	First Max 1hr	Second Max 1hr	99th Percentile	Obs 24hr	First Max 24hr	Second Max 24hr	Days >STD	Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
7983	4.4	4.4	4	359	2.2	2.2	0	1.12	None	1	060710306	14306 Park Ave., Victorville, Ca	Victorville	San Bernardino	CA	09
6960	20.5	15.5	11	314	11.1	9.6	0	0.72*	None	1	060711234	Corner Of Athol And Telescope	Searles Valley	San Bernardino	CA	09
6738	4.3	3.1	3	288	2.1	2.1	0	0.47*	None	1	060712002	14360 Arrow Blvd., Fontana	Fontana	San Bernardino	CA	09

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. <http://www.epa.gov/airquality/airdata/ad_contacts.html>

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: December 29, 2015

Monitor Values Report

Geographic Area: San Bernardino County, CA
Pollutant: SO_2
Year: 2014
Exceptional Events: Included (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs 1hr	First Max 1hr	Second Max 1hr	99th Percentile	Obs 24hr	First Max 24hr	Second Max 24hr	Days >STD	Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
7960	4.8	3.6	3	361	1.9	1.8	0	1.12	None	1	060710306	14306 Park Ave., Victorville, Ca	Victorville	San Bernardino	CA	09
7656	8.8	8	8	347	2.8	1.7	0	0.52	None	1	060711234	Corner Of Athol And Telescope	Searles Valley	San Bernardino	CA	09
7313	4	3.9	3	317	1	0.9	0	0.25*	None	1	060712002	14360 Arrow Blvd., Fontana	Fontana	San Bernardino	CA	09

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. <http://www.epa.gov/airquality/airdata/ad_contacts.html>

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: December 29, 2015

California Environmental Protection Agency
Air Resources Board

Top 4 Summary: Highest 4 Daily Maximum State 24-Hour Sulfur Dioxide Averages

at Victorville-14306 Park Avenue

iADAM

	2009		2010		2011	
	Date	24-Hr Average	Date	24-Hr Average	Date	24-Hr Average
First High:	Mar 31	0.005	May 9	0.007	Apr 18	0.007
Second High:	Apr 2	0.005	May 10	0.007	Apr 19	0.007
Third High:	Apr 3	0.005	May 7	0.006	Apr 20	0.007
Fourth High:	Mar 30	0.005	May 6	0.006	Apr 21	0.007
Annual Average:		0.000		0.000		0.001
Year Coverage:		97		96		97

Notes:

Hourly sulfur dioxide measurements and related statistics are available at Victorville-14306 Park Avenue between 2000 and 2012. Some years in this range may not be represented.

All averages expressed in parts per million.

An exceedance of a standard is not necessarily related to a violation of the standard.

Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.

* means there was insufficient data available to determine the value.

Available Pollutants:

8-Hour Ozone | Hourly Ozone | PM2.5 | PM10 | Carbon Monoxide | Nitrogen Dioxide | State Sulfur Dioxide | Hydrogen Sulfide

California Environmental Protection Agency
Air Resources Board

Top 4 Summary: Highest 4 Daily Maximum State 24-Hour Sulfur Dioxide Averages

iADAM

at Victorville-14306 Park Avenue

	2012		2013		2014	
	Date	24-Hr Average	Date	24-Hr Average	Date	24-Hr Average
First High:	Aug 28	0.003	Jan 18	0.002		*
Second High:	Jan 5	0.002	Jan 4	0.002		*
Third High:	Jan 10	0.002	Jan 22	0.002		*
Fourth High:	Sep 10	0.002	Feb 12	0.002		*
Annual Average:		*		*		*
Year Coverage:		61		*		*

Notes:

Hourly sulfur dioxide measurements and related statistics are available at Victorville-14306 Park Avenue between 2000 and 2012. Some years in this range may not be represented.

All averages expressed in parts per million.

An exceedance of a standard is not necessarily related to a violation of the standard.

Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.

* means there was insufficient data available to determine the value.

Available Pollutants:

8-Hour Ozone | Hourly Ozone | PM2.5 | PM10 | Carbon Monoxide | Nitrogen Dioxide | State Sulfur Dioxide | Hydrogen Sulfide

Appendix D: San Gorgonio Wilderness Area Description

SAGO1 Monitor

The SAGO1 monitor location represents two wilderness areas located in the San Bernardino and San Jacinto Mountains in Southern California. The wilderness areas associated with the SAGO1 monitor are San Gorgonio Wilderness Area and San Jacinto Wilderness area. The SAGO1 site has been operating since March 1988. This site does not have sufficient data for the entire baseline period. Data was not available for the year 2000.

Section I. SAGO1 Wilderness Area Descriptions

I.a. San Gorgonio Wilderness Area

The San Gorgonio Wilderness Area (San Gorgonio) occupies 34,644 acres of the San Bernardino Mountains of southern California, approximately 75 miles east of Los Angeles. Elevations range from 1,341 meters to 3,505 meters at the crest of Mt. San Gorgonio; however most of the wilderness is above the 2,134 meter level. Eleven of the 12 peaks in the Wilderness are above 3,048 meters. Two rivers, the Santa Ana and the White, flow out of the Wilderness. Two small lakes, several meadows, and large, heavily forested areas provide a beautiful sub-alpine oasis in the dry lands that surround the mountain range.

Figure 1. SAGO1 Monitor location

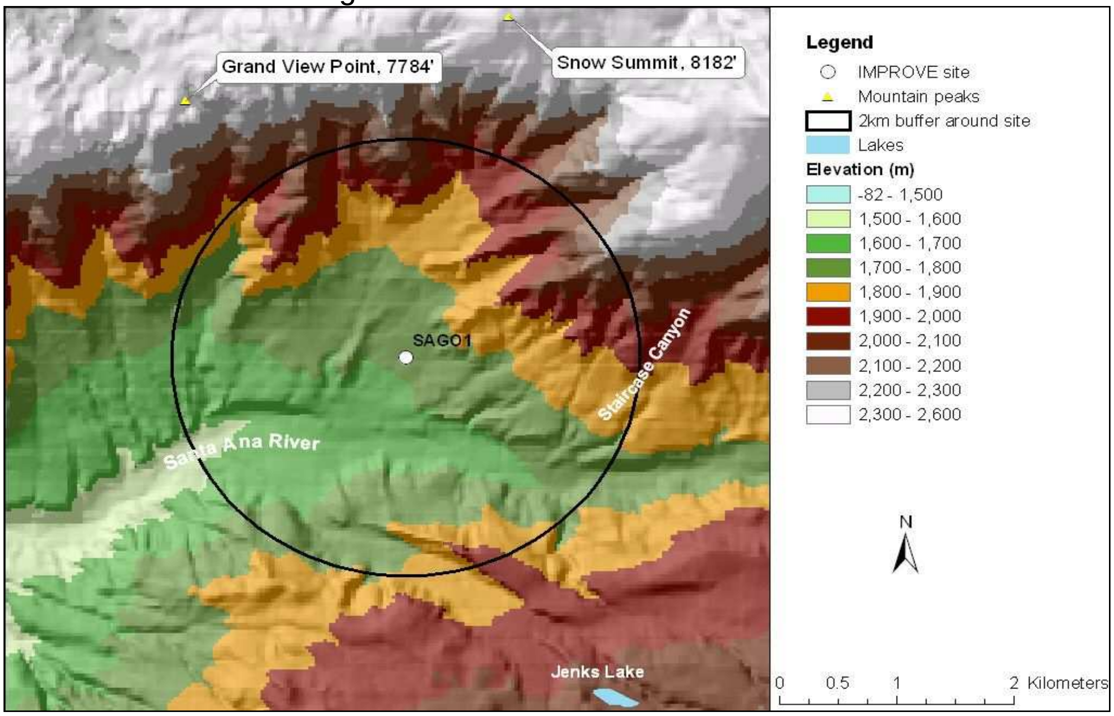


Figure 2. WINHAZE image of San Gorgonio Wilderness Area (5.4 vs. 22.2 dv)

I.b. San Jacinto Wilderness Area

The San Jacinto Wilderness Area (San Jacinto) is part of the San Jacinto Mountains in southern California, adjacent to the Los Angeles Basin to the west, which can be seen from its higher elevations. It is one of the Peninsular Ranges that extend south from the Los Angeles Basin to the tip of the Baja Peninsula and separate the Los Angeles Basin from the Mohave Desert to the east. It occupies 20,564 acres and is split into a north Wilderness and a south Wilderness, separated by the Mount San Jacinto State Park and Wilderness. It is separated from the San Bernardino Mountains and San Gorgonio Wilderness by San Gorgonio Pass. Elevations range from less than 610 meters on the north edge within San Gorgonio Pass to almost 3,353 meters at its higher peaks. The highest peak in the area is San Jacinto Peak located between the north and south Wilderness sections, at an elevation of 3,293 meters.

Figure 3. San Jacinto Wilderness Area

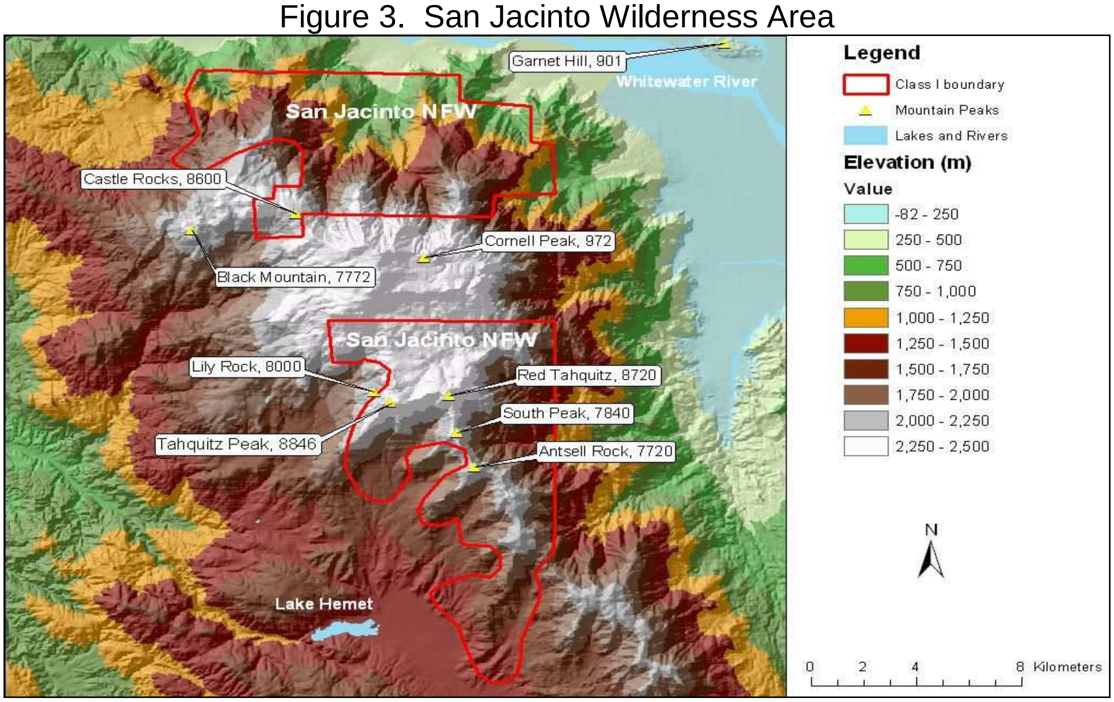


Figure 4. Photograph of San Jacinto Wilderness Area

Figure 5. SAGO1 Monitor location in California

Section II. Visibility Conditions:

II.a. San Gorgonio Wilderness Area

Visibility conditions for San Gorgonio are currently monitored by the SAGO1 IMPROVE monitor. The monitor is located at 34.1939 north latitude and 116.9132 west longitude, in the upper Santa Ana River valley north of the northern San Gorgonio boundary. The orientation of the Santa Ana River valley is west to east, with its mouth to the west, exiting into the Los Angeles basin. The valley bottom location nearest the site is about 1,646 meters, just south of the monitoring site. Elevations rise to about 2,347 meters at the ridge crest, about 2 miles north, and to about 2,987 meters at the ridge crest about 7 miles south of the site.

The SAGO1 IMPROVE site is near the bottom of the Santa Ana River valley at an elevation Off 1,726 meters. This is well below typical San Gorgonio elevations which extend to over 3,048 meters on some of the peaks. Aerosol composition and concentration measured at SAGO1 may not be representative of higher San Gorgonio elevations. When the atmosphere is well mixed to San Gorgonio elevations the SAGO1 site should be representative.

The SAGO1 location is adequate for assessing the 2018 reasonable progress goals for the San Gorgonio Wilderness Class 1 area.

II.b. San Jacinto Wilderness Area

Visibility conditions for San Jacinto are currently monitored by the SAGO1 IMPROVE monitor in the San Gorgonio Wilderness Area. The monitor is located at 34.1939 north latitude and 116.9132 west longitude north of San Gorgonio Pass in the upper Santa Ana River Valley. The monitor is at an elevation of 1726 meters and about 20 miles north of the Wilderness boundary across the San Gorgonio Pass. It is also separated from the San Jacinto Wilderness by the San Gorgonio Wilderness that includes the so-called “Ten Thousand Foot Ridge”, with elevations in excess of 3,048 meters.

The SAGO1 IMPROVE site is near the bottom of the Santa Ana River valley and is separated from the San Jacinto Wilderness by the San Gorgonio Wilderness, which presents a massive intervening obstruction. It should be representative of lower Wilderness elevations when the atmosphere is well mixed, but may not be as representative when it is within a local trapping inversion in the Santa Ana River Valley, or beneath a regional inversion between the SAGO1 elevation and San Jacinto elevations. The San Gorgonio Pass, a potential air pollution corridor between the Los Angeles Basin and the Mohave Desert to the east, also lies between SAGO1 and the San Jacinto Wilderness and could at times create a gradient in concentrations between the SAGO1 monitoring site and San Jacinto Wilderness locations. There could also be a difference in aerosol composition if and when the SAGO1 site is influenced by local sources such as wild land fires.

The SAGO1 location is adequate for assessing the 2018 reasonable progress goals for the San Jacinto Wilderness Class 1 area.

II.c. Baseline Visibility

Baseline visibility is determined from SAGO1 IMPROVE monitoring data for the 20% best and the 20% worst days for the years 2000 through 2004. The baseline visibility for the SAGO1 monitor is calculated at 5.4 deciviews for the 20% best days and 22.2 deciviews for the 20% worst days. Figure 6 represents the worst baseline visibility conditions.

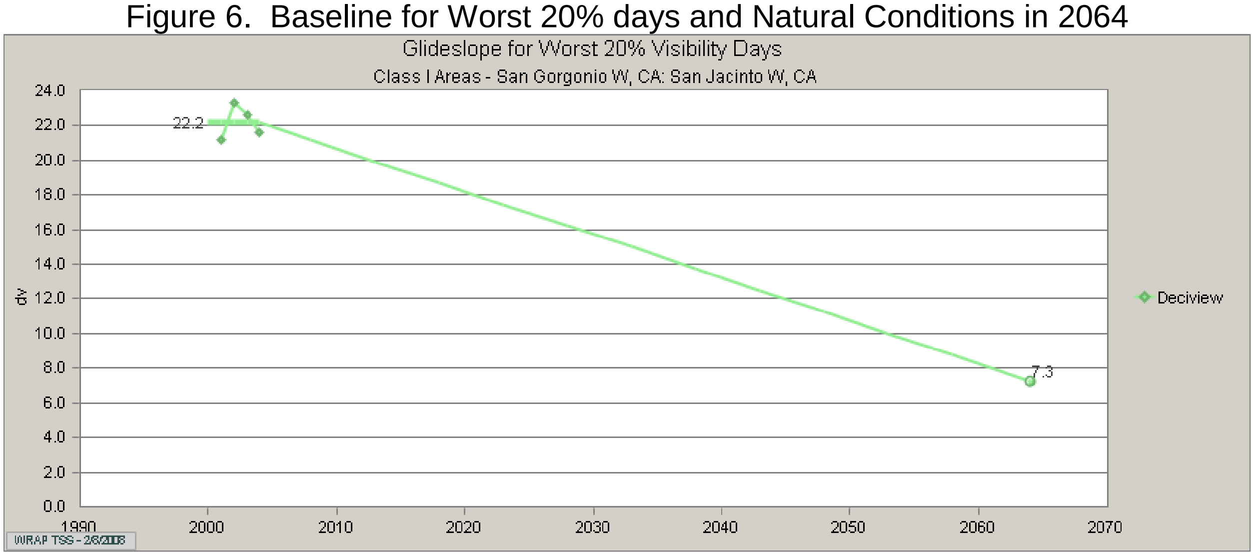
II.d. Natural Visibility

Natural visibility represents the visibility condition that would be experienced in the absence of human-caused impairment. Based on EPA guidance, the natural visibility for the SAGO1 monitor is 1.2 deciviews for the 20% best days and 7.3 deciviews for the 20% worst days. It is possible that the Natural Conditions deciview value for 2064 could change in the future as more is learned about natural plant emissions and wildfire impacts.

II.e. Presumptive Glide Slope and the Uniform Rate of Progress

Figure 6 also shows the uniform rate of progress, or “glide slope.” The glide slope is the rate of reduction in the 20% worst days deciview average that would have to be achieved to reach natural conditions at a uniform pace in the 60 years following the baseline period. The first benchmark along the path towards achieving natural conditions occurs in 2018. The glide slope shows that the 2018 benchmark for the 20% worst days is 18.70 deciviews. According to the Regional Haze Rule, the 20% best days baseline visibility of 5.4 deciviews must be maintained or improved by 2018, the end of the first planning period.

Figure 6. Baseline for Worst 20% days and Natural Conditions in 2064



II.f. Species Contribution

Each pollutant species causes light extinction but its contribution differs on best and worst days. Figure 7 shows the contribution of each species to the 20% best and worst days in the baseline years at SAGO1.

Figure 7. Average Haze species contributions to light extinction in the baseline years

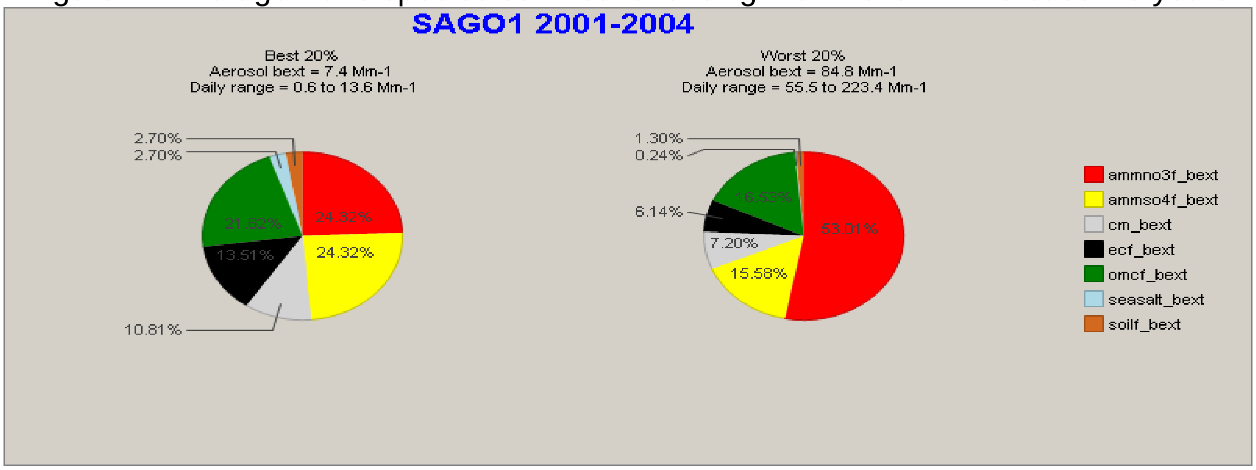
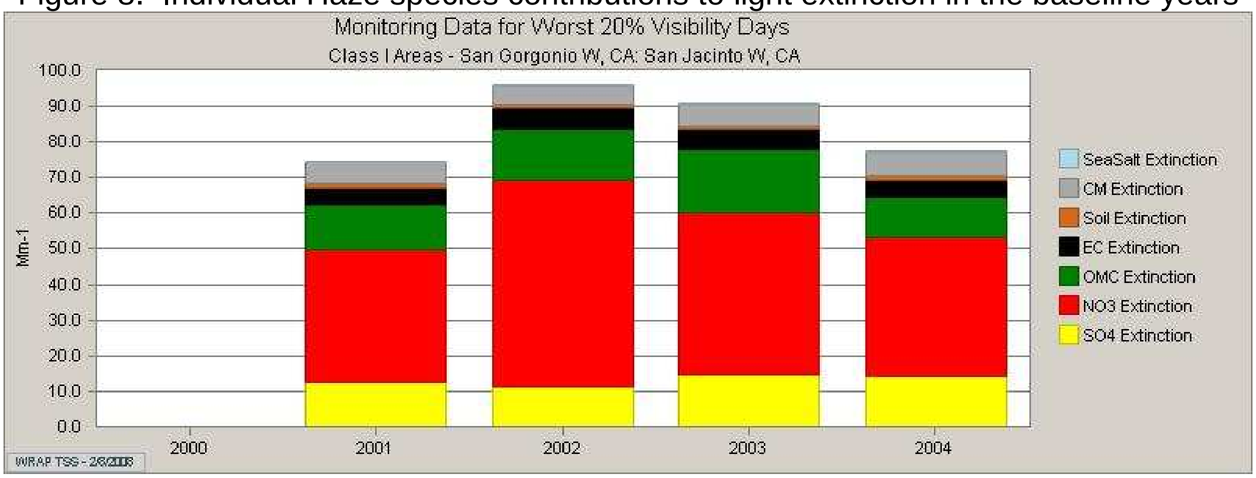


Figure 8. Individual Haze species contributions to light extinction in the baseline years



As shown in Figures 7 and 8, nitrates, organic matter, and sulfates have the strongest contributions to degrading visibility on worst days at the SAGO1 monitor. Nitrates clearly dominate on the worst days, but nitrates and sulfates equally contribute emissions on the best days. Data points for 2000 were insufficient for calculating best and worst days per the Regional Haze Rule Guidance.

Figure 9 depicts the individual species contribution to worst days in 2002. Nitrates increase in the winter and spring months, while organic matter increases in the summer and fall. Sulfates remain relatively stable throughout the year. Nitrates clearly dominate the other haze species on worst days, but organic matter, sulfates, coarse mass and elemental carbon also contribute to the worst days. There are only trace amounts of soil and sea salt present throughout the years.

Figure 10 illustrates the individual species contribution on worst days in 2000-2004 by monthly average. The trend shown is comparable to Figure 9 for nitrates, organic matter, and sulfates. High organic periods vary from year to year due to the unpredictable occurrence of wild fires.

Figure 9. Species contribution on the 20% worst days in 2002

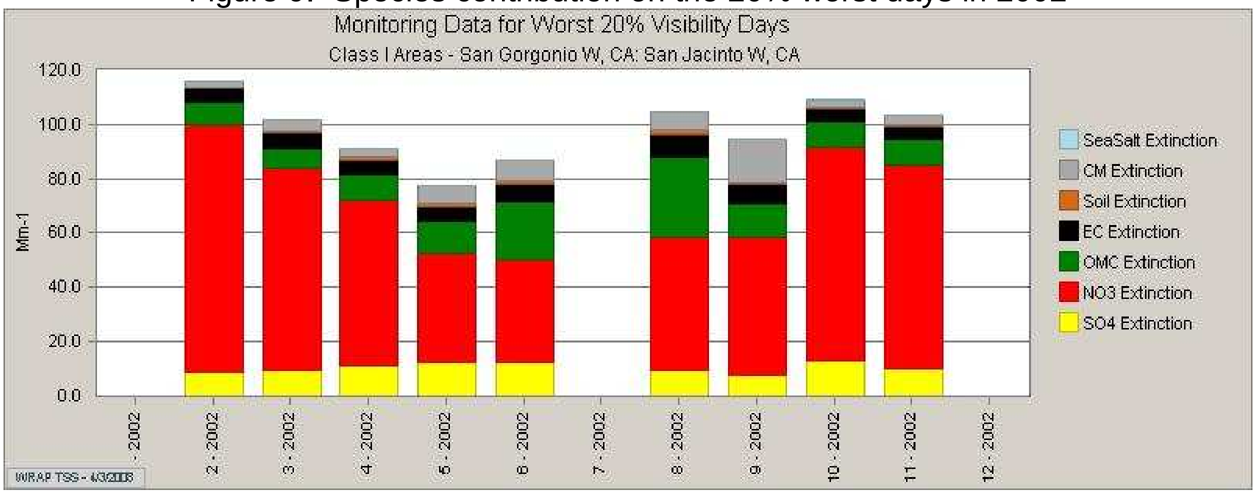
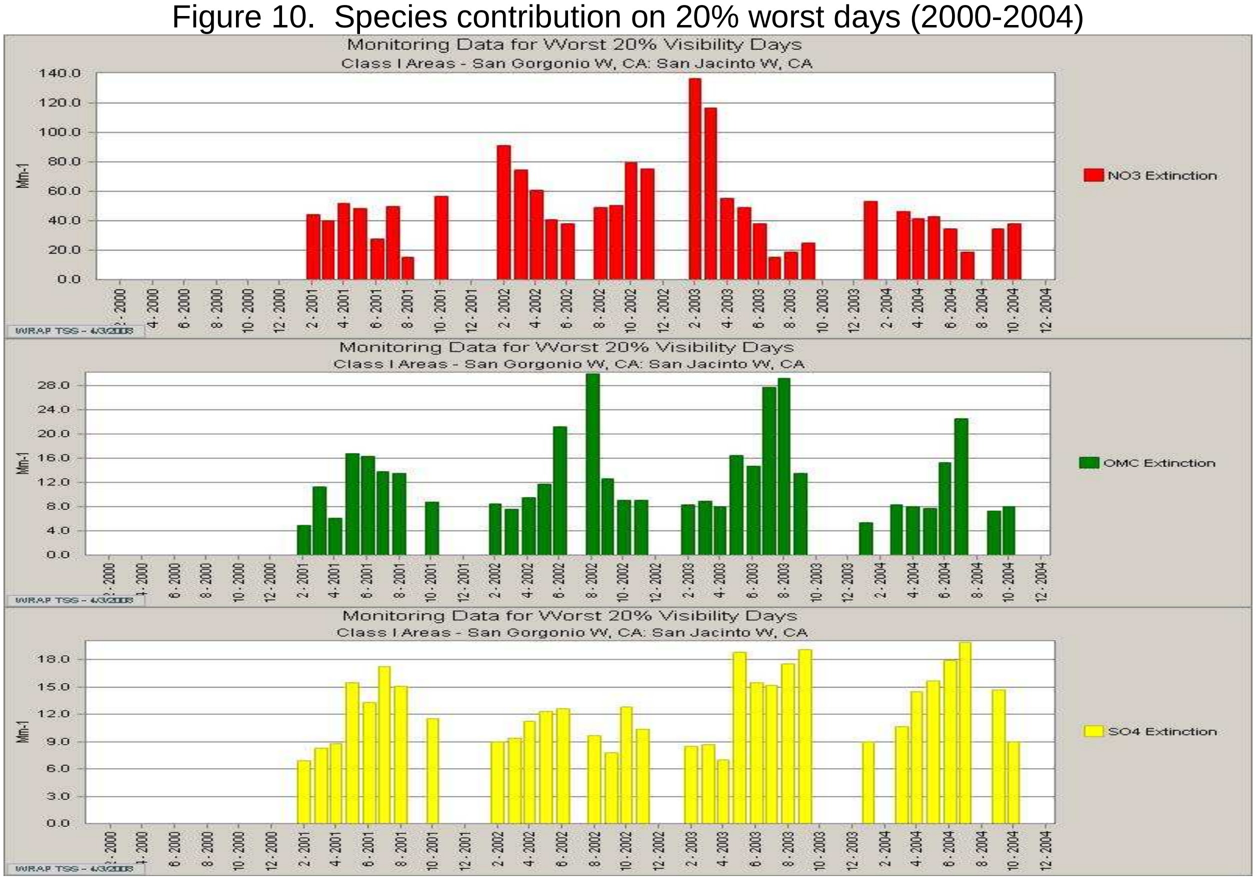


Figure 10. Species contribution on 20% worst days (2000-2004)



II.g. Sources of Haze Species

Both natural and man-made sources contribute to the calculated deciview levels made by haze pollutants at SAGO1. Some haze species arise from sources that are within the control of the State of California or neighboring states. Others arise from natural, uncontrollable situations such as wildfires, sea salt or dust storms in natural areas, whether or not they from in-state or out-of-state (and out-of-country) sources. Finally, other uncontrollable, man-made sources are those industrial pollutants and other man-made (anthropogenic) emissions transported from outside the United States.

Figures 11 and 12 represent the regional contributions to nitrates on the 20% worst days. The WRAP region represents the largest contribution to nitrate in 2002 and 2018 (79%), followed by the Pacific Offshore Region (17%) and emissions from Outside Domain (3%). Mobile sources within California contribute the most nitrate at the SAGO1 monitor. In 2002, 87% of the nitrate from mobile sources at the SAGO1 monitor can be attributed to California. California mobile source emissions reductions are mainly responsible for improvement in nitrates in 2018.

Figure 13 shows the primary organic carbon source contribution from California and the outside regions. The largest contributor to primary organic carbon at the SAGO1 monitor is from natural fire sources within California. California represents 99% of all natural fire source contributions.

Figure 14 illustrates the total organic carbon source apportionment from 2000-2004 for anthropogenic and biogenic sources. The anthropogenic and biogenic primary source emissions account for 59% of the total organic carbon. Biogenic secondary emissions account for 34% of the total organic carbon emissions and anthropogenic secondary is responsible for the remaining emissions.

Figures 15 and 16 represent the regional contributions to sulfate on the 20% worst days in 2002 and 2018 at SAGO1. The WRAP region represents 38% of the sulfate contributions in 2002 and 2018, followed by the emissions from Pacific Offshore (31%) and the Outside Domain Region (27%). California contributes 33% of the total sulfate emissions seen at the SAGO1 monitor.

Individually, emissions from outside the modeling domain contribute the most to sulfate concentrations at the SAGO1 monitor. The next largest contributor to sulfate concentrations is area sources in the Pacific Offshore.

Figure 11. Regional Nitrate contribution to haze in 2002 and 2018

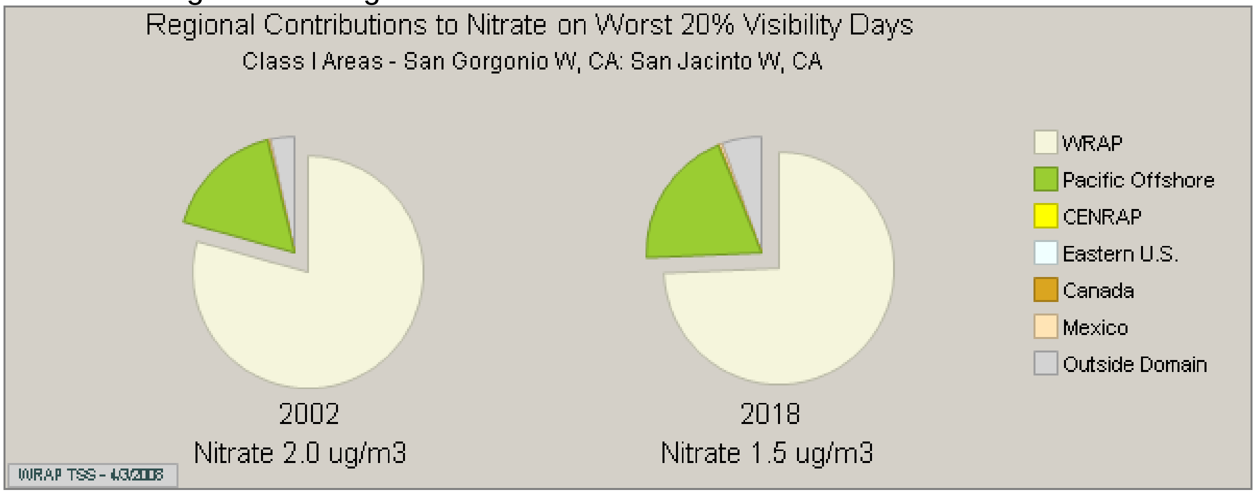


Figure 12. Nitrate source contribution from CA and outside regions

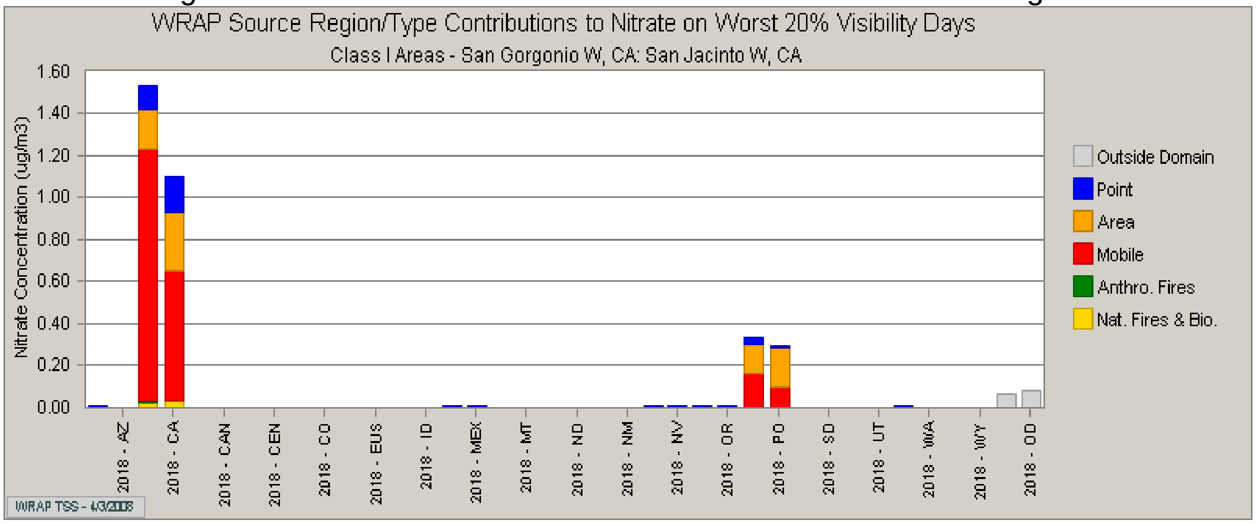


Figure 13. Organic carbon source contribution from CA and outside regions

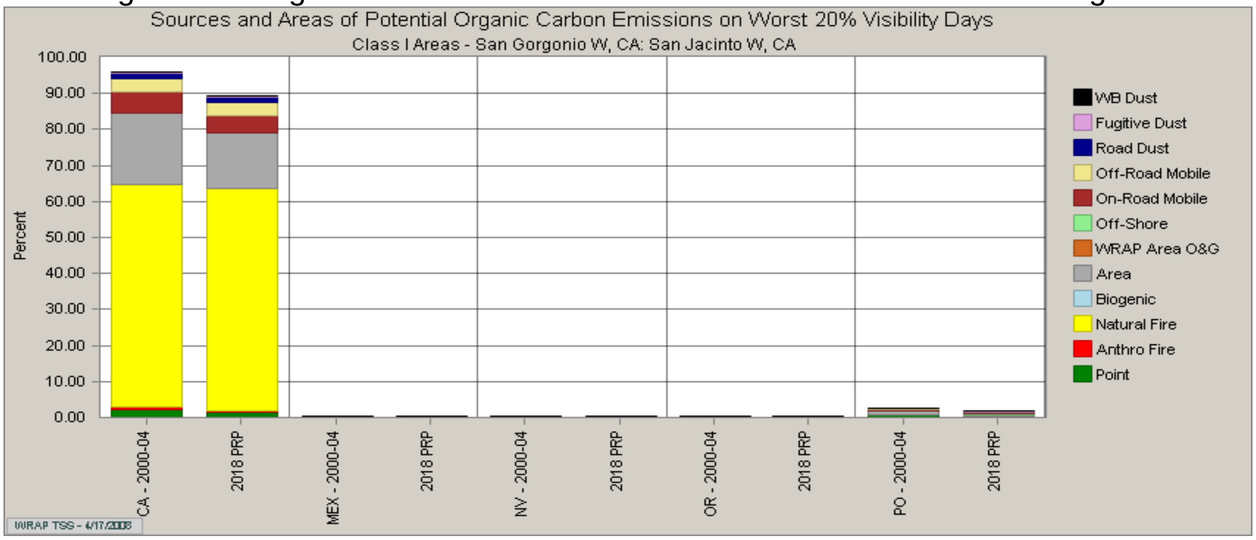


Figure 14. Organic carbon Anthropogenic and Biogenic Source Apportionment

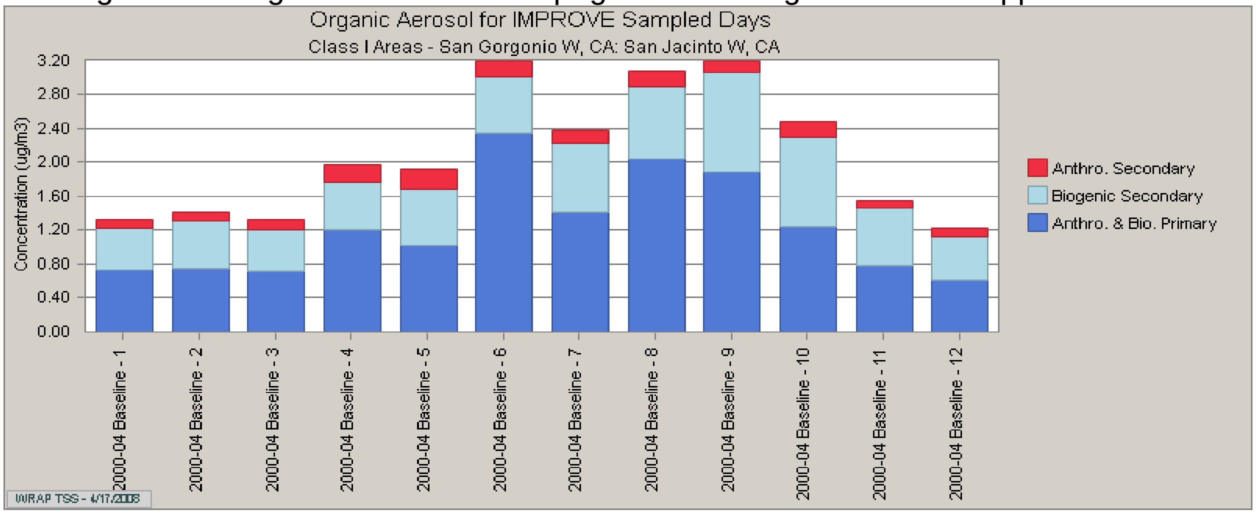


Figure 15. Regional Sulfate contribution to haze in 2002 and 2018

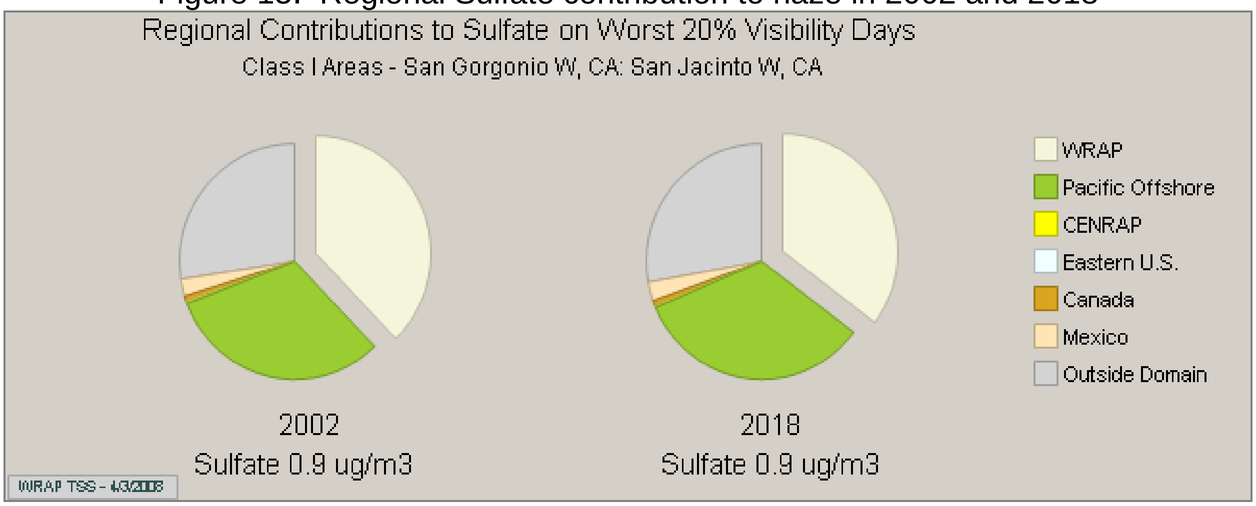
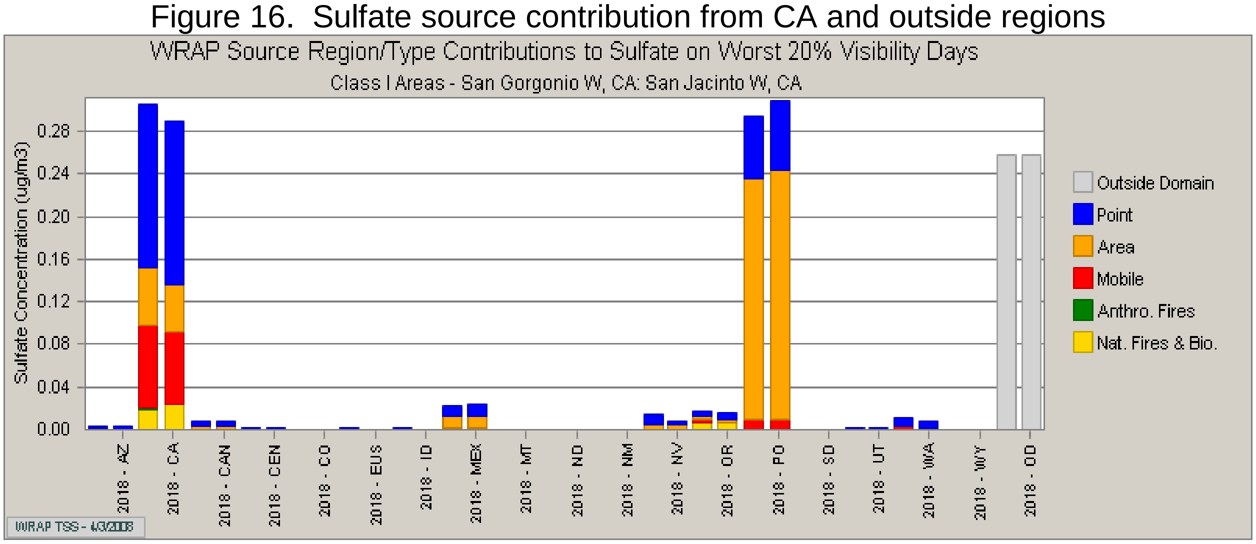


Figure 16. Sulfate source contribution from CA and outside regions



Appendix E: MDAQMD Rule Development Calendar

Master Rule Development Calendar 2015

District	Rule #	Rule Title	Action Considered
MD	102	Definitions	Update definitions. Update VOC definition to exempt TBac, use 40 CFR 51.100(s) rather than 40 CFR 51.00(s)(1). Update SIP to current. Includes removal of prior SB Rule 103 from SB Co SIP.
MD	104	Reporting of Source Data and Analysis	Update SIP to current. Includes removal of SC Rule 104 from RVSD Co SIP.
MD	206	Posting of Permit to Operate	Amend rule to add "Request for Waiver" section.
MD	218	Stack Monitoring	Amend. Standardize breakdown reporting.
MD	301	Permits	Amend to reflect increase in cost.
MD	302	Other Fees	Consolidation of Rules 302, 304, 305, 306, 307, 308, 309, 310, 311 and 313
MD	303	Hearing Board Fees	Potential amendment to reformat, reorganize and update. Potential shift to make fees better reflect services rendered.
MD	304	Analysis Fees	Consolidate with 302 - Other Fees, and rescind.
MD	305	State Mandated Fees	Consolidate with 302 - Other Fees, and rescind.
MD	306	Demolition and Reonvation Project Fees	Consolidate with 302 - Other Fees, and rescind.
MD	307	Asbestos Waste Disposal Site Fees	Consolidate with 302 - Other Fees, and rescind.
MD	308	Stationary Source Monitoring Device Fees	Consolidate with 302 - Other Fees, and rescind.
MD	309	Stationary Source Monitoring Device Fee	Consolidate with 302 - Other Fees, and rescind.
MD	310	Source Emission Analysis Fees	Consolidate with 302 - Other Fees, and rescind.
MD	311	Permit Application Review Fee (Certificate of Occupancy Fee)	Consolidate with 302 - Other Fees, and rescind.
MD	312	Fees For Federal Operating Permits	Amend to recover public notice and allow pass through direct costs.
MD	313	Fees for Emission Reduction Credit Banking	Consolidate with 302 - Other Fees, and rescind.
MD	314	Reinspection Fee	New rule to recover costs of excessive inspections. Could be consolidated in Rule 304.
MD	401	Visible Emissions	Exempt sandblasters perm H&S 41900 et seq and 17 CCR 92000 et seq; Exempt pile drives per H&S 41701.5. Incorporate Method 9/22. Update SIP to current. Includes removal of SC Rule 401 from RVSD Co SIP.
MD	403	Fugitive Dust	Analyze PM Measures for cost effectiveness. Amend rule if necessary. Update SIP to current. Includes removal of SC Rule 403 and SC Rule 403.1 from RVSD Co SIP.
MD	403.1	Fugitive Dust Control for SVPA	Include analsis of PM Measures for Cost Effectiveness (consolidate with required report). Update rule to reflect findings. Update to conform to PM Plan requirements. Update SIP to current. Includes removal of SC Rule 403 and SC Rule 403.1 from RVSD Co SIP. Address LALD in 74 FR 40751, 8/13/09.
MD	403.2	Fugitive Dust Control for MDPA	Include analsis of PM Measures for Cost Effectiveness (consolidate with required report). Update rule to reflect findings. Update to conform to PM Plan requirements. Update SIP to current. Includes removal of SC Rule 403 and SC Rule 403.1 from RVSD Co SIP.

This calendar is produced to satisfy the requirements of Health Safety Code 40923(a). Inclusion on this list does not necessarily indicate that a particular action or any action at all will be taken on the item.

5/7/2015

Master Rule Development Calendar 2015

District	Rule #	Rule Title	Action Considered
MD	403.3	Fugitive Dust Control for Off-Site Agricultural Sources	Add dust control for agricultural sources. Analyze PM Measures for cost effectiveness. Add rule.
MD	403.4	Fugitive Dust Control for On-Site Agricultural Sources	New Rule to conform with with Agricultural Confined Animal Facilities, Agricultural Fugitive Dust, Agricultural Best Management Practices, Agricultural IC Engines, and Rule 219 proposed amendments.
MD	404	Particulate Matter - Concentration	Update SIP to current. Includes removal of SC Rule 404 from RVSD Co SIP.
MD	405	Solid Particulate Matter - Weight	Update SIP to current. Includes removal of SC Rule 405 from RVSD Co SIP.
MD	406	Specific Contaminants	Update SIP to current. Includes removal of SC Rule 406 from RVSD Co SIP.
MD	407	Liquid and Gaseous Air Contaminants	Update SIP to current. Includes removal of SC Rule 407 from RVSD Co SIP.
MD	408	Circumvention	Update SIP to current. Includes removal of SC Rule 408 from RVSD Co SIP.
MD	409	Combustion Contaminants	Update SIP to current. Includes removal of SC Rule 409 from RVSD Co SIP.
MD	431	Sulfur content of fuels	Update to conform with CARB Diesel requirements Title 13 CCR 2281. Update SIP to current. Includes removal of SC Rule 431, SC Rule 431.1, SC Rule 431.2, SC Rule 431.3 from RVSD Co SIP.
MD	432	Gasoline Specifications	Update SIP to current. Includes removal of RC Rule 432 from RVSD Co SIP.
MD	442	Usage of Solvents	Amend to update language. Include analsis of PM Measures for Cost Effectiveness (consolidate with required report). Review for RACT. Update rule to reflect findings.
MD	443	Labeling of Solvents	Update SIP to current. Includes removal of RC Rule 443 and SC Rule 443.1 from RVSD Co SIP.
MD	444	Open Outdoor Burning	Analyze PM Measures for cost effectiveness. Amend rule if necessary.
MD	461	Gasoline Transfer & Dispensing	Add provisions regarding efficiency of vapor systems from 95 to 98, for EVR. Update inspection frequency requirement. Add fleet vehicle onboard EVR provisions. Update SIP to current. Includes removal of SC Rule 461 from RVSD Co SIP. Update for RACT.
MD	462	Organic Liquid Loading	Update SIP to current. Includes removal of SC Rule 462 from RVSD Co SIP. Update for RACT.
MD	463	Storage of Organic Liquids	Update definitions, update test methods, add the standard test method language. Update SIP to current. Includes removal of SC Rule 463 from RVSD Co SIP. Update for RACT.
MD	468	Sulfur Recovery Units	Update SIP to current. Includes removal of RC Rule 468 from RVSD Co SIP.
MD	469	Sulfuric Acid Units	Update SIP to current. Includes removal of RC Rule 469 from RVSD Co SIP.
MD	470	Asphalt Air Blowing (Rescinded)	Update SIP to current. Includes removal of RC Rule 470 from RVSD Co SIP.
MD	472	Reduction of Animal Matter	Update SIP to current. Includes removal of RC Rule 472 from RVSD Co SIP.
MD	473	Disposal of Solid and Liquid Wastes	Update SIP to current. Includes removal of RC Rule 473 from RVSD Co SIP.
MD	480	Natural Gas Fired Control Devices	Update SIP to current.
MD	900	Standards of Performance for New Stationary Sources (NSPS)	Review annually and update as necessary.

This calendar is produced to satisfy the requirements of Health Safety Code 40923(a). Inclusion on this list does not necessarily indicate that a particular action or any action at all will be taken on the item.

5/7/2015

Master Rule Development Calendar 2015

District	Rule #	Rule Title	Action Considered
MD	901	Asbestos sources not covered by Federal Regulation	Potential new rule.
MD	1000	National Emission Standards for Hazardous Air Pollutants (NESHAP)	Review annually and update as necessary. Update SIP to current. Includes removal of SC Rule 1102 and SC Rule 1102.1 from RVSD Co SIP.
MD	1102	Fugitive Emissions of VOCs from Components at Pipeline Transfer Stations	Update SIP to current. Includes removal of SC Rule 466, SC Rule 466.1 and SC Rule 1173 from RVSD Co SIP.
MD	1103	Cutback and Emulsified Asphalt	Update SIP to current. Includes removal of SC Rule 1108 and SC Rule 1108.1 and SC Rule 1120 from RVSD Co SIP.
MD	1104	Organic Solvent Degreasing Operations	Analyze PM Measures for cost effectiveness. Amend rule if necessary. Update SIP to current. Includes removal of SC Rule 1122 and SC Rule 1171 from RVSD Co SIP. Revise rule to current RACT based on RACT re-analysis results.
MD	1106	Marine Coating Operations	Update SIP to current. Includes removal of SC Rule 109, SC Rule 481, SC Rule 1106 and SC Rule 1106.1 from RVSD Co SIP.
MD	1113	Architectural Coatings Rule	Update SIP to current. Includes removal of SC Rule 109, SC Rule 481, and SC Rule 1151 from RVSD Co SIP.
MD	1114	Wood Products Coating Operations	Analyze PM Measures for cost effectiveness. Amend rule if necessary. Update SIP to current. Includes removal of SC Rule 109, SC Rule 481, SC Rule 1104, SC Rule 1106, SC Rule 1106.1 and SC Rule 1136 from RVSD Co SIP.
MD	1115	Metal Parts & Products Coating Operations	Update SIP to current. Includes removal of SC Rule 109, SC Rule 481, SC Rule 1106, SC Rule 1106.1, SC Rule 1107, SC Rule 1125 and SC Rule 1126 from RVSD Co SIP.
MD	1116	Automotive Refinishing Operations	Update SIP to current. Includes removal of SC Rule 109, SC Rule 481, SC Rule 1106, SC Rule 1106.1, SC Rule 1115 and SC Rule 1151 from RVSD Co SIP.
MD	1117	Graphic Arts and Paper, Film, Foil and Fabric Coatings	Update SIP to current. Includes removal of SC Rule 1128, SC Rule 1130, SC Rule 1130.1 and SC Rule 1145 from RVSD Co SIP.
MD	1118	Aerospace Vehicle Parts and Products Coating Operations	Update rule to reflect SCM, MACT, and NESHAP requirements. Remove averaging provisions. Update SIP to current. Includes removal of SC Rule 1124 from RVSD Co SIP. CEQA IS/Neg Dec.
MD	1126	Solid Waste Landfills (VOC)	Analyze PM Measures for cost effectiveness. Amend rule if necessary. Update SIP to current. Includes removal of SC Rule 1150.1 from RVSD Co SIP.
MD	1133	Composting and Related Operations	Rescind and possibly re-adopt rule pursuant to Peremptory Writ of Mandate Case No. CIV BS800976
MD	1157	Boilers & Process Heaters	Analyze PM Measures for cost effectiveness. Amend rule if necessary. Update SIP to current. Includes removal of SC Rule 1121, SC Rule 1146 and SC Rule 1146.1 from RVSD Co SIP.
MD	1158	Electric Utility Operations	Analyze PM Measures for cost effectiveness. Amend rule if necessary. Update SIP to current. Includes removal of SC Rule 1135 from RVSD Co SIP.
MD	1159	Stationary Gas Turbines	Update SIP to current. Includes removal of SC Rule 1134 from RVSD Co SIP.

This calendar is produced to satisfy the requirements of Health Safety Code 40923(a). Inclusion on this list does not necessarily indicate that a particular action or any action at all will be taken on the item.

5/7/2015

Master Rule Development Calendar 2015

District	Rule #	Rule Title	Action Considered
MD	1160	Internal Combustion Engines	Analyze PM Measures for cost effectiveness. Update for RACT. Conform to ATCM, NESHAP and NSPS. Update SIP to current. Includes removal of SC Rule 1110.1, SC Rule 1110.2 and SC Rule 1110 from RVSD Co SIP.
MD	1160.1	Internal Combustion Engines in Agricultural Operations	Update SIP to current. Includes removal of SC Rule 1110.1, SC Rule 1110.2 and SC Rule 1110 from RVSD Co SIP.
MD	1161	Cement Kilns	Analyze PM Measures for cost effectiveness. Amend rule if necessary. Update SIP to current. Includes removal of SC Rule 1112 and SC Rule 1112.1 from RVSD Co SIP. Update for RACT.
MD	1162	Polyester Resin Operations	Update SIP to current. Includes removal of SC Rule 1141 from RVSD Co SIP.
MD	1165	Glass Melting Furnaces	Update SIP to current. Includes removal of SC Rule 1117 from RVSD Co SIP.
MD	1186	Agriculture Large Confined Animal Facility	New Rule to conform with with Agricultural Confined Animal Facilities, Agricultural Fugitive Dust, Agricultural Best Management Practices, Agricultural IC Engines, and Rule 219 proposed amendments. SJVAPCD Rule is now considered RACT for this source. 77 FR 2228 1/17/12.
MD	1300	General	Provide cross references to Reg XVI.
MD	1302	Procedure	Provide cross reference to Reg XVI.
MD	1320	New Source Review for Toxic Air Contaminants	Update cross references with adoption of PSD rules.
MD	2001	Transportation Conformity	Amend to conform with USEPA regulations.
MD	2003	Consultation procedures	Rescind if MOU signed and approved into SIP.
MD	New	Commercial Charbroiling	Analyze PM Measures for cost effectiveness. Add rule if necessary.
MD	New	Residential Water Heaters	Analyze PM Measures for cost effectiveness. Add rule if necessary.
MD	New	Furnaces	Analyze PM Measures for cost effectiveness. Add rule if necessary.
MD	New	Soil Decontamination	Analyze PM Measures for cost effectiveness. Add rule if necessary.
MD	New	Woodworking Operations	Analyze PM Measures for cost effectiveness. Add rule if necessary.
MD	New	Lawnmower Buy Back Program	Analyze PM Measures for cost effectiveness. Add rule if necessary.
MD	New	Large Spray Booths	Analyze PM Measures for cost effectiveness. Add rule if necessary.
MD	New	Wood Burning Fireplaces	Analyze PM Measures for cost effectiveness. Add rule if necessary.
MD	Notice	Notification ATCM's and MACT Standards	Review annually and update as necessary.
MD	Plan	State Triannial Update	Update for latest planning assumptions (Local facility data, regional transportation data & statewide growth data)
MD	Plan	PM10 Attainment & Maintainence Plan	Update to comply with USEPA request.
MD	Plan	ROP Milestone Upldate	Update for latest planning assumptions (Local facility data, regional transportation data & statewide growth data)
MD	Reg 4	Regulation IV - Prohibitions	Rescission of old SCAQMD rules in SIP for Riverside County and replacement by 8hr O3 adopted Fed Negative Declarations.

This calendar is produced to satisfy the requirements of Health Safety Code 40923(a). Inclusion on this list does not necessarily indicate that a particular action or any action at all will be taken on the item.

5/7/2015

Master Rule Development Calendar 2015

District	Rule #	Rule Title	Action Considered
MD	Reg 7	Air Pollution Emergency Contingency Actions	Consolidate regulation into single rule.
MD	Reg 11	Regulation XI - Source Specific Standards	Rescission of old SCAQMD rules in SIP for Riverside County and replacement by 8hr O3 adopted Fed Negative Declarations.
MD	Reg 12	Federal Operating Permits	Modify to implement PSD Program.
MD	Reg 16	PSD	Adopt to implement PSD Program.
MD	Reg 20	Conformity	Modify to implement PSD Program.
MD	FNDs	Re-adopt Various FNDs	Re-adopt various Federal Negative Declarations for sources which are not present in the District: SC Rule 1103; SC Rule 1105; SC Rule 1119; SC Rule 1123; SC Rule 1141.1; SC Rule 1142; SC Rule 1148; SC Rule 1158; SC Rule 1159; SC Rule 1164; SC Rule 1175; SC Rule 1176.

This calendar is produced to satisfy the requirements of Health Safety Code 40923(a). Inclusion on this list does not necessarily indicate that a particular action or any action at all will be taken on the item.

Appendix F: MDAQMD Mineral Industry Emissions Inventory Guidelines

Mojave Desert Air Quality Management District
Antelope Valley Air Pollution Control District

Emissions Inventory Guidance

Mineral Handling and Processing Industries

I. Reason for Guidance

The mineral handling and processing industry is the Mojave Desert Air Quality Management District's (District) dominant industry in terms of emissions, number of permit units, and revenue. The mineral industry performs a number of characteristic operations associated with extracting minerals from the Earth's crust and processing them. Aside from equipment and material differences, these operations and processes are essentially the same from facility to facility. Accordingly, the District has prepared this document to ensure that these common operations and processes have their emissions estimated consistently throughout the region.

Why is the District concerned with consistency? Two reasons: accuracy and fairness. The District emissions inventory as a whole will be more accurate if every process of a given type has its emissions estimated using the same methodology (as opposed to a myriad methods of unknown or questioned accuracy). Actions taken by the District that depend on the emissions inventory (such as attainment plans and the rules that implement them) will be fairly applied if all processes are represented in the emissions inventory to the same extent.

This attempt to impose regularity and claim to improve accuracy should not be construed as a criticism of existing inventories or methodologies. On the contrary, District staff greatly appreciates the efforts of the many individuals who have created the existing methodologies and used them to estimate emissions. Nor does District staff claim to have the most accurate inventory; rather, District staff are attempting to establish a minimum level of known accuracy. Methods more accurate than those presented herein will be accepted.

II. Background

Federal and State law requires air districts to prepare and maintain as accurate and current an emissions inventory as possible. This inventory must include criteria (oxides of nitrogen, volatile organic compounds, carbon monoxide, oxides of sulfur, particulate matter, and lead), hazardous, and toxic air pollutants. The emissions inventory is used to determine attainment strategies, progress towards clean air goals, and air quality relative to other districts.

III. Approach of this Guidance

This guidance will present methodologies for a large number of emissions-generating operations and processes. The methodologies will be provided with several levels of increasing complexity and accuracy; each level of increased complexity will require greater input (and effort) from the user. In practice, this means that an equation is provided for each process, with a variety of default equation inputs specified. At the lowest level of complexity, an emission factor is specified that can simply be multiplied by a process activity rate.

The greatest level of complexity and accuracy involves the use of data from a source test (if feasible). Of course, the District would prefer all emission inventories to be based on source test results or continuous emission monitor (CEMS) data. This is not feasible due to obvious cost and time constraints. However, a properly performed and documented source test (and/or CEMS data) provides the greatest accuracy possible, and represents a method that will always be accepted in lieu of a methodology presented herein. Other methods may be accepted, if they have been documented and approved by the District.

This guidance document is accompanied by a set of electronic spreadsheets that contains each of the equations used in these methodologies. This allows the user to 'plug-in' her local values and calculates her local result.

IV. Source Test Data

For a source test to be used to generate an emission factor, it must include additional emissions- and activity-related information. The following can be considered required supplemental elements for a source test report that is submitted to support or generate a set of equipment-specific emission factors.

A. <u>Process flow diagram</u> that specifies pickup points
B. <u>Control equipment description</u> that defines operational parameters during test (such as water use or pressure drop).
C. <u>Throughput</u> during test in hourly units (or shorter term units), including a discussion of maximum design throughput, average throughput, and actual throughput during the test.
D. <u>Exhaust concentrations and mass emission rates</u>, including front half, back half, and total

emissions. The concentrations and mass rates should identify values for total hydrocarbon, reactive organic gases and volatile organic compounds. The concentrations and mass rates should also identify values for total suspended particulate, particulate 10 microns and less, and particulate 2.5 microns and less.

V. Calculation Spreadsheet Accessory

An accessory spreadsheet has been prepared for this document. The spreadsheet contains each of the equations referenced in the guidance. The equations are programmed into input and output spreadsheet cells to assist the user. The spreadsheet was prepared in Microsoft Excel, and two versions are available. The spreadsheet is titled "Mineral Guidance Equations" and is in Microsoft Excel 97 format. The version titled "Mineral Guidance Equations 95" is in Microsoft Excel 95 format.

The spreadsheet is in the format of a multiple-worksheet workbook, with a separate worksheet for each method (the worksheets have individual tabs at the lower left). Those values which can be entered by the user are defined in dark blue, and the cells in which the values can be typed have a turquoise background. Selected turquoise cells may have a value pre-entered; these values are the District default values, and can be replaced by a known local value. After all necessary turquoise cells have a value, the results of the equation are automatically calculated (the user may need to hit the 'enter' key after entering the last value). In each case the calculated values are displayed in units of pounds and tons of the applicable pollutants.

Please contact District emissions inventory staff if you encounter any problems or errors with the calculation spreadsheet accessory.

VI. Methods

Each method will be presented in the same format. The method will begin with a detailed discussion of the processes and operations for which it is an applicable emissions estimation methodology. The method itself will then be provided, beginning with the most conservative and least complex version, and followed by increasingly complex and data-intensive versions. Each method will culminate with the complete equation (where possible), for which the user has the option of providing all inputs. The District has prepared tables calculating likely values for various common inputs. Each method contains a discussion of applicable control strategies (where possible), and appropriate calculation methods for those. Each method concludes with a source reference.

A. Blast Hole Drilling

This procedure applies to the drilling of charge holes for open pit or open shelf blasting. Note that the activity input for the equation requires the total amount of material shifted, including, topsoil, overburden and ore. Blast hole drilling is often performed by portable internal combustion engine powered drills; exhaust emissions from this equipment are not accounted for by this method. Such exhaust emissions should be estimated using methods presented elsewhere.

"Shifted" is defined as loosened sufficiently to require removal or further handling.

Least Complex:

Assume negligible particulate emissions from blast hole drilling. This can only be assumed by facilities shifting less than 50,000 tons per year of ore, overburden and topsoil combined.

Intermediate Complexity:

This method employs a conservative factor times the total amount of material shifted by blasting.

$$E = E_f \times Q$$

E = Particulate matter emissions rate in pounds per year
E_f = Emission factor in units of pounds of particulate per ton shifted by blasting
Q = Amount of material of all types shifted by blasting during the year in tons

TSP E_f = 0.001 pounds/ton
PM_{10} E_f = 0.0008 pounds/ton
$PM_{2.5}$ E_f = 0.0008 pounds/ton

Blast Hole Drilling Table 1 -- Blasting Activity Based Emissions

Activity in tons (yearly)	50000	75000	100000	125000	150000	175000	200000	225000	250000
TSP Emissions (tons)	0.03	0.04	0.05	0.06	0.08	0.09	0.10	0.11	0.13
PM10 Emissions (tons)	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
PM2.5 Emissions (tons)	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10

Most Complex:

This method requires an estimate of the number of shot holes drilled on an annual basis.

$$E = E_f \times N$$

E = Particulate matter emissions rate in pounds per year
E_f = Emission factor in units of pounds of particulate per hole drilled
N = Number of blast holes drilled per year

TSP E_f = 1.3 pounds/hole
PM_{10} E_f = 0.68 pounds/hole
$PM_{2.5}$ E_f = 0.68 pounds/hole

Blast Hole Drilling Table 2 -- Drilling Activity Based Emissions														
Number of Holes (yearly)	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400
TSP Emissions (tons)	0.07	0.13	0.20	0.26	0.33	0.39	0.46	0.52	0.59	0.65	0.72	0.78	0.85	0.91
PM10 Emissions (tons)	0.03	0.07	0.10	0.14	0.17	0.20	0.24	0.27	0.30	0.34	0.37	0.41	0.44	0.47
PM2.5 Emissions (tons)	0.03	0.07	0.10	0.14	0.17	0.20	0.24	0.27	0.30	0.34	0.37	0.41	0.44	0.47

Control Techniques:

None are presently quantified. The methods assume a wet drilling operation. Enclosures, air return or other control strategies can be employed for an estimated control efficiency, subject to District review and approval.

Source:

The intermediate complexity method employs a low confidence emission factor presented in Chapter 15 of the Air & Waste Management Association Air Pollution Engineering Manual, 1992 edition (Stone and Quarrying Processing). The high complexity method employs a relatively highly rated emission factor derived from overburden drilling operations at western surface coal mines presented in §11.9 of USEPA's AP-42 (January 1995 reformatted version).

B. Dust Entrainment from Blasting

This procedure applies to the fracturing and loosening of topsoil, ore, overburden and substrate in open pits and open shelves through the use of explosives. Note that activity rates for this method require the total amount of material shifted through the use of blasting, including topsoil, overburden and ore. “Shifted” is defined as loosened sufficiently to require removal or further handling.

Least Complex:

This method employs a conservative factor times the total amount of material shifted by blasting.

$$E = E_f \times B$$

E = Particulate matter emissions rate in pounds per year
E_f = Emission factor in units of pounds of particulate per ton shifted by blasting
B = Amount of material of all types shifted by blasting during the year in tons

E_f (TSP) = 0.16 pounds/ton
E_f (PM_{10}) = 0.08 pounds/ton
E_f ($PM_{2.5}$) = 0.08 pounds/ton

Blasting Table 1 -- Weight Based Emissions									
Activity in tons (yearly)	50000	75000	100000	125000	150000	175000	200000	225000	250000
TSP Emissions (tons)	4	6	8	10	12	14	16	18	20
PM10 Emissions (tons)	2	3	4	5	6	7	8	9	10
PM2.5 Emissions (tons)	2	3	4	5	6	7	8	9	10

Most Complex:

This method requires information on the horizontal area shifted by blasting, and the number of such blasts performed during the year. This method cannot be used if blasting depth exceeds 70 feet.

$$E = k \times N \times 0.0005 \times A^{1.5}$$

E = Particulate matter emissions rate in pounds per year
k = Particulate matter size factor
N = Number of blasts per year
A = Horizontal area shifted by each blast in square feet

k (TSP) = 1.00
k (PM_{10}) = 0.52
k ($PM_{2.5}$) = 0.52

Blasting Table 2 -- Area Based TSP Emissions in tons per year							
	Number of Weekly Blasts						
Typical Shelf Area	1	2	3	4	5	6	7
1000	0.41	0.82	1.23	1.64	2.06	2.47	2.88
1500	0.76	1.51	2.27	3.02	3.78	4.53	5.29
2000	1.16	2.33	3.49	4.65	5.81	6.98	8.14
2500	1.63	3.25	4.88	6.50	8.12	9.75	11.38
3000	2.14	4.27	6.41	8.54	10.68	12.82	14.95
3500	2.69	5.38	8.08	10.77	13.46	16.15	18.84
4000	3.29	6.58	9.87	13.16	16.44	19.73	23.02

Blasting Table 3 -- Area Based PM10 and PM2.5 Emissions in tpy							
	Number of Weekly Blasts						
Typical Shelf Area	1	2	3	4	5	6	7
1000	0.21	0.43	0.64	0.86	1.07	1.28	1.50
1500	0.39	0.79	1.18	1.57	1.96	2.36	2.75
2000	0.60	1.21	1.81	2.42	3.02	3.63	4.23
2500	0.84	1.69	2.54	3.38	4.23	5.07	5.92
3000	1.11	2.22	3.33	4.44	5.55	6.66	7.78
3500	1.40	2.80	4.20	5.60	7.00	8.40	9.80
4000	1.71	3.42	5.13	6.84	8.55	10.26	11.97

Control Techniques:

None are presently quantified. The method does not assume any emission reducing procedures. Certain control techniques are available, such as blast blankets. Control strategies can be employed for an estimated control efficiency, subject to District review and approval.

Source:

The most complex method employs a poorly rated emission factor derived from blasting operations at western surface coal mines presented in §11.9 of USEPA's AP-42 (January 1995 reformatted version).

C. Criteria Emissions from Blasting Explosives

This procedure estimates the criteria pollutants generated by the detonation of explosives for blasting. This is a "least complex" method that multiplies an emission factor by the total amount of explosives detonated in a year.

$$E = E_f \times A$$

E = Pollutant emissions rate in pounds per year
E_f = Emission factor in units of pounds of pollutant per ton of explosive detonated
A = Amount of explosive detonated throughout the year in tons

Explosives Table 1 -- Emission Factors

Explosive Type	Composition	CO	NOx	TOG
Black Powder	Potassium nitrate, charcoal and sulfur	170	---	4.2
Smokeless Powder	Nitrocellulose	77	---	1.1
Dynamite, straight	Nitroglycerine, sodium nitrate, wood pulp, calcium carbonate	281	---	2.5
Dynamite, ammonia	Nitroglycerine, ammonium nitrate, sodium nitrate, wood pulp	63	---	1.3
Dynamite, gelatin	Nitroglycerine	104	53	0.7
ANFO	Ammonium nitrate, fuel oil	67	17	---
TNT	Trinitrotoluene	796	---	14.3
RDX	Cyclotrimethylenetrinitroamine	196	---	---
PETN	Pentaerythritol tetranitrate	297	---	---

Note that VOC emissions are considered negligible for all explosives. TSP, PM_{10} and $PM_{2.5}$ emissions are subsumed within the dust entrainment estimations.

Source:

This method is presented in §13.3 of USEPA's AP-42 (January 1995 reformatted version).

D. Bulldozing, Scraping and Grading of Materials

This procedure applies to the bulldozing, scraping and grading of topsoil, overburden, waste material, and ore through the use of heavy equipment such as bulldozers, graders, scrapers, etc. This procedure does not apply to the lifting and dumping of said materials; such lifting and dumping emissions should be estimated using methods presented elsewhere.

Least Complex:

This method applies a conservative factor times the annual hours of operation.

$$E = E_f \times T$$

E = Particulate matter emissions rate in pounds per year
E_f = Emission factor in units of pounds of particulate per hour of operation
T = Annual activity in hours

TSP E_f = 886 pounds/hour
PM_{10} E_f = 431 pounds/hour
$PM_{2.5}$ E_f = 132 pounds/hour
(These emission factors were calculated using the defaults given in the Most Complex section)

Bulldozing Table 1 - Time Based Emissions					
Activity in hours (yearly)	1040	2080	2920	6240	8760
TSP Emissions (tons)	460.72	921.44	1293.56	2764.32	3880.68
PM10 Emissions (tons)	224.12	448.24	629.26	1344.72	1887.78
PM2.5 Emissions (tons)	68.64	137.28	192.72	411.84	578.16

Most Complex:

This method presents an equation requiring inputs for the moisture content and silt content of the material being moved, as well as an estimate of the total amount of material moved.

$$E = E_f \times T \qquad E_f = 2.76 \times k \times \frac{s^{1.5}}{M^{1.4}}$$

E = Particulate matter emissions rate in pounds per year
E_f = Emission factor in pounds per hour of operation
T = Extent of material moving operation in hours per year
k = Particulate aerodynamic factor (see below)
s = Average silt content in percent (%)
M = Average moisture content of material in percent (%)

k (TSP) = 0.74 (dimensionless)
k (PM_{10}) = 0.36
k ($PM_{2.5}$) = 0.11

Conservative silt content default is 30 percent
Conservative moisture content default is 0.5 percent

Bulldozing Table 2 -- Emission Factor (Ef) for Total Suspended Particulates (TSP)							
	Moisture Content (%)						
Silt Content (%)	0.25	0.50	0.75	1.00	1.50	2.00	2.50
0.50	5.0290	1.9056	1.0802	0.7221	0.4093	0.2736	0.2002
1.00	14.2241	5.3899	3.0553	2.0424	1.1577	0.7739	0.5663
5.00	159.0303	60.2612	34.1594	22.8347	12.9440	8.6527	6.3311
10.00	449.8055	170.4444	96.6173	64.5864	36.6111	24.4737	17.9071
15.00	826.3455	313.1264	177.4974	118.6527	67.2589	44.9610	32.8974
20.00	1272.2422	482.0896	273.2751	182.6778	103.5519	69.2219	50.6489
25.00	1778.0125	673.7407	381.9135	255.3000	144.7182	96.7406	70.7840
30.00	2337.2581	885.6552	502.0384	335.6006	190.2370	127.1688	93.0479
50.00	5028.9787	1905.6266	1080.2146	722.0974	409.3248	273.6238	200.2072
70.00	8330.5150	3156.6749	1789.3780	1196.1561	678.0475	453.2584	331.6438

Bulldozing Table 3 -- Emission Factor (Ef) for PM10							
	Moisture Content (%)						
Silt Content (%)	0.25	0.50	0.75	1.00	1.50	2.00	2.50
0.50	2.4465	0.9271	0.5255	0.3513	0.1991	0.1331	0.0974
1.00	6.9198	2.6221	1.4864	0.9936	0.5632	0.3765	0.2755
5.00	77.3661	29.3163	16.6181	11.1088	6.2971	4.2094	3.0800
10.00	218.8243	82.9189	47.0030	31.4204	17.8108	11.9061	8.7116
15.00	402.0059	152.3318	86.3501	57.7229	32.7206	21.8729	16.0041
20.00	618.9286	234.5301	132.9446	88.8703	50.3766	33.6755	24.6400
25.00	864.9790	327.7658	185.7958	124.2000	70.4034	47.0630	34.4354
30.00	1137.0445	430.8593	244.2349	163.2651	92.5477	61.8659	45.2666
50.00	2446.5302	927.0616	525.5098	351.2906	199.1310	133.1143	97.3981
70.00	4052.6830	1535.6797	870.5082	581.9138	329.8609	220.5041	161.3402

Bulldozing Table 4 -- Emission Factor (Ef) for PM2.5							
	Moisture Content (%)						
Silt Content (%)	0.25	0.50	0.75	1.00	1.50	2.00	2.50
0.50	0.7476	0.2833	0.1606	0.1073	0.0608	0.0407	0.0298
1.00	2.1144	0.8012	0.4542	0.3036	0.1721	0.1150	0.0842
5.00	23.6396	8.9577	5.0777	3.3944	1.9241	1.2862	0.9411
10.00	66.8630	25.3363	14.3620	9.6007	5.4422	3.6380	2.6619
15.00	122.8351	46.5458	26.3847	17.6376	9.9979	6.6834	4.8902
20.00	189.1171	71.6620	40.6220	27.1548	15.3928	10.2897	7.5289
25.00	264.2992	100.1507	56.7709	37.9500	21.5122	14.3804	10.5219
30.00	347.4303	131.6514	74.6273	49.8866	28.2785	18.9035	13.8314
50.00	747.5509	283.2688	160.5724	107.3388	60.8456	40.6738	29.7605
70.00	1238.3198	469.2355	265.9886	177.8070	100.7908	67.3762	49.2984

Control Techniques:

Water spray is commonly used to reduce fugitive dust from this type of activity. Water spray essentially increases the moisture content of the material. Therefore, to take credit for the use of water spray as an emissions control technique, measure the moisture content of the material when being actively moistened and use this value in the method.

Particulate emissions can also be reduced through the use of wind screens or enclosures (on a relatively small scale). The District assumes that complete coverage by wind screens (on the windward side) will provide a control efficiency of 75 percent.

$$E_c = E \times \left(\frac{100 - C}{100} \right)$$

E_c	=	Controlled emissions
E	=	Uncontrolled emissions
C	=	Control efficiency in percent (%)

Source:

The method is derived from the Western Surface Coal Mining discussion in §11.9 of USEPA's AP-42 (January 1995 reformatted version).

E. Material Handling Operations

This procedure applies to the handling of materials in batches and conveyor belts, including loading, unloading, transferring and dropping. "Materials" include topsoil, overburden, waste material and ore. This procedure specifically applies to the operation of heavy equipment such as front end loaders and shovels as well as conveyor belts. This procedure is intended to be applied to each material handling point. This means that each batch drop should be counted. For example, a loader dropping a quantity of material into a temporary storage pile, then dropping into a dump truck, then the dump truck dumping into a long term storage pile would be three separate operations which should be separately accounted for.

Least Complex:

This method multiplies a conservative factor by the total amount of material moved in a year.

$$E = E_f \times Q$$

E = Particulate matter emissions rate in pounds per year
E_f = Emission factor in units of pounds of particulate per ton handled
Q = Quantity of material handled per year in tons

TSP E_f = 0.029 pounds/ton
PM_{10} E_f = 0.014 pounds/ton
$PM_{2.5}$ E_f = 0.004 pounds/ton
(These emission factors were calculated using the defaults given in the Most Complex section)

Material Handling Table 1 - Weight Based Emissions											
Activity in tons (yearly)	10000	20000	30000	40000	50000	60000	70000	80000	90000	100000	110000
TSP Emissions (tons)	0.15	0.29	0.44	0.58	0.73	0.87	1.02	1.16	1.31	1.45	1.60
PM10 Emissions (tons)	0.07	0.14	0.21	0.28	0.35	0.42	0.49	0.56	0.63	0.70	0.77
PM2.5 Emissions (tons)	0.06	0.11	0.17	0.22	0.28	0.33	0.39	0.44	0.50	0.55	0.61

Most Complex:

This method presents an equation requiring inputs for the mean wind speed at the handling site, moisture content of the material being moved, and an estimate of the total amount of material handled.

$$E = E_f \times Q \qquad E_f = k \times 0.0032 \times \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$$

E = Particulate matter emissions rate in pounds per year
E_f = Emission factor in pounds per ton handled
Q = Quantity of material handled per year in tons
k = Particulate aerodynamic factor (see below)

U = Mean wind speed in miles per hour
M = Average moisture content of material handled in percent (%)

k (TSP) = 0.74 (dimensionless)
k (PM_{10}) = 0.36
k ($PM_{2.5}$) = 0.11

Conservative mean wind speed default is 7.7 mph
Conservative moisture content default is 0.5 percent

Material Handling Table 2 -- Emission Factor (Ef) for TSP							
	Wind Speed (mph)						
Moisture Content (%)	5.0	7.5	10.0	12.5	15.0	20.0	25.0
0.25	0.0435	0.0737	0.1072	0.1432	0.1815	0.2639	0.3527
0.50	0.0165	0.0279	0.0406	0.0543	0.0688	0.1000	0.1336
0.75	0.0093	0.0158	0.0230	0.0308	0.0390	0.0567	0.0758
1.00	0.0062	0.0106	0.0154	0.0206	0.0261	0.0379	0.0506
1.50	0.0035	0.0060	0.0087	0.0117	0.0148	0.0215	0.0287
2.00	0.0024	0.0040	0.0058	0.0078	0.0099	0.0144	0.0192
2.50	0.0017	0.0029	0.0043	0.0057	0.0072	0.0105	0.0140

Material Handling Table 3 -- Emission Factor (Ef) for PM10							
	Wind Speed (mph)						
Moisture Content (%)	5.0	7.5	10.0	12.5	15.0	20.0	25.0
0.25	0.0212	0.0359	0.0521	0.0697	0.0883	0.1284	0.1716
0.50	0.0080	0.0136	0.0198	0.0264	0.0335	0.0486	0.0650
0.75	0.0045	0.0077	0.0112	0.0150	0.0190	0.0276	0.0369
1.00	0.0030	0.0052	0.0075	0.0100	0.0127	0.0184	0.0246
1.50	0.0017	0.0029	0.0042	0.0057	0.0072	0.0104	0.0140
2.00	0.0012	0.0020	0.0028	0.0038	0.0048	0.0070	0.0093
2.50	0.0008	0.0014	0.0021	0.0028	0.0035	0.0051	0.0068

Material Handling Table 4 -- Emission Factor (Ef) for PM2.5							
	Wind Speed (mph)						
Moisture Content (%)	5.0	7.5	10.0	12.5	15.0	20.0	25.0
0.25	0.0065	0.0110	0.0159	0.0213	0.0270	0.0392	0.0524
0.50	0.0025	0.0042	0.0060	0.0081	0.0102	0.0149	0.0199
0.75	0.0014	0.0024	0.0034	0.0046	0.0058	0.0084	0.0113
1.00	0.0009	0.0016	0.0023	0.0031	0.0039	0.0056	0.0075
1.50	0.0005	0.0009	0.0013	0.0017	0.0022	0.0032	0.0043
2.00	0.0004	0.0006	0.0009	0.0012	0.0015	0.0021	0.0029
2.50	0.0003	0.0004	0.0006	0.0008	0.0011	0.0016	0.0021

Control Techniques:

Water spray is commonly used to reduce fugitive dust from this type of activity. Water spray essentially increases the moisture content of the material. Therefore, to take credit for the use of water spray as an emissions control technique, measure the moisture content of the material when being actively moistened and use this value in the method.

Some materials and process lines are exposed and lose moisture rapidly. Measuring moisture content at a given point in the process line will not accurately reflect the control efficiency of the wet suppression. In these cases, refer to the following table.

Material Handling Table 5 -- Control Techniques		
Control Technique	Control Efficiency (%)	Discussion
Water Spray (Application Point)	75	
Chemical Additive (Application Point)	85	
Water Spray (Downstream Effect)	75-(5*n)	n = number of transfer points from initial application
Chemical Additive (Downstream Effect)	85-(5*n)	
Conveyor with Half Cover	50	Covers less than 60 percent of conveyor
Conveyor with Three Quarter Cover	70	Covers less than 85 percent of conveyor
Conveyor with Full Cover	85	Completely covers conveyor width
Baghouse with Multiple Pickups	95	Baghouse must meet minimum flow standard given in Table 6
Baghouse with Single Pickup (Unenclosed)	97	
Baghouse with Single Pickup (Partial Enclosure)	98	
Baghouse with Single Pickup (Full Enclosure)	99	
Baghouse with Single Pickup (Attached)	99.5	

Material Handling Table 6 -- Required Baghouse Flow Ratios (in cfm/sq ft)																			
	Type of Material																		
Type of Baghouse/ Filter Cloth	Alumina	Bauxite	Carbon Black	Cement	Clay	Feldspar	Fly Ash	Graphite	Gypsum	Iron Oxide	lead Oxide	Lime	Limestone	Quartz	Rock Dust	Sand	Silica	Slate	Talc
Shaker/Woven or Reverse Air/Woven	2.5	2.5	1.5	2.0	2.5	2.2	2.5	2.0	2.0	2.5	2.0	2.5	2.7	2.8	3.0	2.5	2.5	3.5	2.5
Pulse Jet/Felt or Reverse Air/Felt	8	8	5	8	9	9	8	8	10	7	6	10	8	8	9	10	7	12	10

Note that higher baghouse control efficiencies can be justified with source tests, permit conditions and/or design factors.

Particulate emissions can also be reduced through the use of wind screens or enclosures (on a relatively small scale). The District assumes that complete coverage by wind screens (on the windward side) will provide a control efficiency of 75 percent.

Once the control efficiency of the applicable control technique is known, the following equation is used to determine the "controlled" emissions from the operation or process:

$$E_c = E \times \left(\frac{100 - C}{100} \right)$$

E_c = Controlled emissions
E = Uncontrolled emissions
C = Control efficiency in percent (%)

Source:

The method is presented in the Aggregate Handling and Storage Pile discussion in §13.2.4 of USEPA's AP-42 (January 1995).

F. Material Crushing and Screening Operations

This procedure applies to the crushing and screening of materials. This is effectively a "least complex" method that multiplies an emission factor by annual throughput. This method applies to each occurrence of a crushing or screening operation; in a process line with primary crushing and a screen, secondary crushing and a screen, and tertiary crushing followed by a screen, this method should be applied six times (to six potentially different throughputs).

$$E = E_f \times T$$

E = Particulate matter emissions rate in pounds per year
E_f = Emission factor in units of pounds of particulate per ton of throughput
T = Throughput of material processed per year in tons

Material Crushing and Screening Table 1 -- Emission Factors			
	Emission Factor		
Processing Device	TSP	PM10	PM2.5
Dry Primary or Secondary Crushing	0.280	0.017	0.005
Wet Primary or Secondary Crushing	0.018	0.001	0.001
Tertiary Crushing	1.850	0.112	0.035
Dry Screening	0.160	0.120	0.038
Wet Screening	neg	neg	neg

Note: "neg" indicates negligible emissions.

Control Techniques:

Please refer to the control techniques discussion in the Material Handling Operations section.

Source:

The method is derived from the Sand and Gravel Processing discussion in the Air & Waste Management Association Air Pollution Engineering Manual (1992 edition).

G. Wind Erosion From Stockpiles

This procedure applies to wind erosion from open storage piles.

Least Complex:

This method employs a conservative emission factor multiplied by the surface area of a stockpile.

$$E = E_f \times A$$

E = Particulate matter emissions rate in tons per year
E_f = Emission factor in units of tons of particulate per surface acre
A = Exposed surface area of stockpile in acres

TSP E_f = 8.10 tons/acre
PM_{10} E_f = 4.05 tons/acre
$PM_{2.5}$ E_f = 1.62 tons/acre
(These emission factors were calculated using the defaults given in the Most Complex section)

Stockpile Table 1 -- Area Based Emissions								
Area (acres)	0.02	0.11	0.23	0.46	1.00	2.00	5.00	10.00
Area (square feet)	1000	5000	10000	20000	43560	87120	217800	435600
TSP Emissions (tons)	0.19	0.93	1.86	3.72	8.10	16.20	40.50	81.00
PM10 Emissions (tons)	0.09	0.46	0.93	1.86	4.05	8.10	20.25	40.50
PM2.5 Emissions (tons)	0.04	0.19	0.37	0.74	1.62	3.24	8.10	16.20

Most Complex:

This method presents an equation requiring inputs for the silt content of the stockpiled material, the average number of days during the year in question that experienced at least 0.01 inches of precipitation, the percentage of time during the year that the unobstructed wind speed exceeded 12 mph, and the exposed surface area of the stockpile.

$$E = E_f \times A \qquad E_f = J \times 1.7 \times \frac{sL}{1.5} \times \frac{(365 - P)}{235} \times \frac{I}{15} \times \frac{365}{2000}$$

E = Particulate matter emissions rate in tons per year
E_f = Emission factor in tons per acre
A = Exposed surface area of stockpile in acres
J = Particulate aerodynamic factor (see below)
sL = Average silt loading of storage pile in percent (%), see below
P = Average number of days during the year with at least 0.01 inches of precipitation
I = Percentage of time with unobstructed wind speed >12 mph in percent (%)

J (TSP)	=	1.0
J (PM_{10})	=	0.5
J ($PM_{2.5}$)	=	0.2

Conservative silt loading default is 30 percent
Conservative days with precipitation default is 20
Conservative windy hours default is 13.3 percent

Stockpile Table 2 -- Silt Content Percentages	
Stockpile Material	Silt Content (%)
Limestone	0.5
Crushed Limestone	1.5
Asphalt Batching	5.0
Coal	6.0
Concrete Batching	6.0
Sand and Gravel Processing	8.0
Overburden	10.0
Blend Ore and Dirt	15.0
Flue Dust	20.0
Inorganic Minerals	30.0

Stockpile Table 3 -- TSP Emissions for P = 20 days with >=0.01 inches								
I (% of winds > than 12 mph)	Silt Content (%)							
	0.5	1.0	5.0	10.0	15.0	20.0	25.0	30.0
5	0.051	0.101	0.506	1.012	1.518	2.024	2.530	3.036
10	0.101	0.202	1.012	2.024	3.036	4.049	5.061	6.073
15	0.152	0.304	1.518	3.036	4.555	6.073	7.591	9.109
20	0.202	0.405	2.024	4.049	6.073	8.097	10.122	12.146

Stockpile Table 4 -- PM10 Emissions for P = 20 days with >=0.01 inches								
I (% of winds > than 12 mph)	Silt Content (%)							
	0.5	1.0	5.0	10.0	15.0	20.0	25.0	30.0
5	0.025	0.051	0.253	0.506	0.759	1.012	1.265	1.518
10	0.051	0.101	0.506	1.012	1.518	2.024	2.530	3.036
15	0.076	0.152	0.759	1.518	2.277	3.036	3.796	4.555
20	0.101	0.202	1.012	2.024	3.036	4.049	5.061	6.073

Stockpile Table 5 -- PM2.5 Emissions for P = 20 days with >=0.01 inches								
I (% of winds > than 12 mph)	Silt Content (%)							
	0.5	1.0	5.0	10.0	15.0	20.0	25.0	30.0
5	0.010	0.020	0.101	0.202	0.304	0.405	0.506	0.607
10	0.020	0.040	0.202	0.405	0.607	0.810	1.012	1.215
15	0.030	0.061	0.304	0.607	0.911	1.215	1.518	1.822
20	0.040	0.081	0.405	0.810	1.215	1.619	2.024	2.429

Control Techniques:

Fugitive particulate emissions from storage piles can be reduced through the use of water spray (by increasing the moisture content of the material). The following table presents the required minimum water application rates to achieve a given control efficiency. Water application or use records must accompany any watering control efficiency claim.

Stockpiles Table 6 -- Watering Control Efficiency (%)	
Desired Efficiency (%)	Daily Water Application Rate (gal/acre)
50	1703
60	2390
70	3396
80	5083
85	6506
90	8892
95	14279

Stockpile fugitive particulate emissions can also be reduced through the use of wind screens or enclosures. The District assumes that complete coverage by wind screens (on the windward side) will provide a control efficiency of 75 percent.

Once the control efficiency of the applicable control technique is known, the following equation is used to determine the "controlled" emissions from the operation or process:

$$E_c = E \times \left(\frac{100 - C}{100} \right)$$

E_c = Controlled emissions
E = Uncontrolled emissions
C = Control efficiency in percent (%)

Source:

The method is derived from the Fugitive Emissions discussion in the Air & Waste Management Association Air Pollution Engineering Manual (1992 edition).

H. Stationary Equipment Exhaust

This procedure estimates exhaust from a wide variety of fuel-burning stationary equipment used in the mineral industry. This is a "least complex" method that multiplies an emission factor by annual fuel use, and should be used only if source test or manufacturer guaranteed emissions data is not available for the equipment in question. This method requires fuel type and annual fuel use as inputs. Boilers, Space Heaters, Generic Industrial Process Heaters, Internal Combustion Engines, and Gas Turbines are covered by this method.

$$E = E_f \times F$$

E = Pollutant emissions rate in pounds per year
E_f = Emission factor in units of pounds of pollutant per unit of fuel use
F = Annual fuel consumption in millions of cubic feet (MMCF) for natural gas or 1000's of gallons for gasoline, diesel or propane

Stationary Equipment Table 1 -- Emission Factors

Equipment Type	Fuel Type	Fuel Units	TOG	ROG	CO	NOx	SOx	TSP	PM10
Boiler >100 MMBTU/hr	Natural Gas	MMCF	3.18	1.40	40.0	550.0	0.60	3.00	3.00
Boiler 10-100 MMBTU/hr	Natural Gas	MMCF	6.36	2.80	35.0	140.0	0.60	3.00	3.00
Boiler <10 MMBTU/hr	Natural Gas	MMCF	12.05	5.30	20.0	100.0	0.60	3.00	3.00
Boiler, Cogeneration	Natural Gas	MMCF	3.18	1.40	40.0	275.0	0.60	3.00	3.00
Boiler	Fuel Oil #2, 0.5% S	1000 gal	0.21	0.20	5.0	20.0	71.80	2.00	1.95
	Fuel Oil #2, 0.05% S	1000 gal	0.21	0.20	5.0	20.0	7.18	2.00	1.95
	Propane or LPG	1000 gal	0.65	0.60	1.8	8.8	1.50	0.26	0.26
Space Heater	Natural Gas	MMCF	12.05	5.30	20.0	100.0	0.60	3.00	3.00
	Fuel Oil #2, 0.5% S	1000 gal	0.74	0.70	5.0	18.0	72.00	2.50	2.44
	Fuel Oil #2, 0.05% S	1000 gal	0.74	0.70	5.0	18.0	7.20	2.50	2.44
	Propane or LPG	1000 gal	0.69	0.63	2.0	7.5	1.50	1.85	1.85
Generic Industrial Process Heater	Natural Gas	MMCF	12.05	5.30	20.0	100.0	0.60	3.00	2.85
	Fuel Oil #2, 0.5% S	1000 gal	0.21	0.20	5.0	20.0	53.50	2.00	1.95
	Fuel Oil #2, 0.05% S	1000 gal	0.21	0.20	5.0	20.0	5.35	2.00	1.95
	Propane or LPG	1000 gal	0.65	0.60	1.8	8.8	1.50	0.26	0.25
Internal Combustion Engine	Natural Gas	MMCF	799.42	187.06	430.0	3400.0	0.60	10.00	9.94
	Fuel Oil #2, 0.5% S	1000 gal	37.42	33.08	102.0	469.0	15.60	33.50	32.70
	Fuel Oil #2, 0.05% S	1000 gal	37.42	33.08	102.0	469.0	1.56	33.50	32.70
	Propane or LPG	1000 gal	800.39	187.29	129.0	139.0	0.35	5.00	4.97
	Gasoline	1000 gal	164.13	148.96	3940.0	102.0	5.31	6.47	6.43
Gas Turbine, Cogeneration	Natural Gas	MMCF	66.54	15.57	115.0	413.0	0.60	14.00	13.92
Gas Turbine	Natural Gas	MMCF	121.50	28.43	115.0	413.0	0.60	14.00	13.92
	Fuel Oil #2, 0.5% S	1000 gal	5.56	4.92	15.4	67.8	70.00	5.00	4.88
	Fuel Oil #2, 0.05% S	1000 gal	5.56	4.92	15.4	67.8	7.00	5.00	4.88

Note that, for the above table, the ROG emission factors can be used as VOC emission factors, and the PM_{10} emission factors can be used as $PM_{2.5}$ emission factors.

Source:

These generic factors are derived from a variety of sources (primarily USEPA's AP-42).

I. Mobile Equipment and Vehicular Exhaust

This procedure estimates the exhaust and brake wear emissions from a variety of mobile equipment common in the mineral industry. Note that this method estimates exhaust from mobile equipment only, and dust entrainment due to the travel of mobile equipment on paved and unpaved surfaces should be estimated using the methods presented elsewhere in this document. This is effectively a "least complex" method that multiplies a conservative emission factor by annual activity in hours of use, fuel consumption in 1000's of gallons, or travel in 1000's of miles.

$$E = E_f \times A$$

E	=	Pollutant emissions rate in pounds per year
E_f	=	Emission factor in units of pounds of pollutant per unit of activity
A	=	Annual activity consumption in 1000's of horsepower-hours, 1000's of gallons of diesel fuel burned, or 1000's of vehicle miles traveled

Mobile Equipment Table 1 -- Emission Factors										
Equipment Type	Activity Type	Activity Units	TOG	ROG	CO	NOx	SOx	TSP	PM10
Heavy Duty Diesel Off Road	Hours of Operation	1000 hp-hr	2.42	2.34	7.5	24.3	2.91	1.54	1.53
Heavy Duty Gasoline Off Road	Hours of Operation	1000 hp-hr	16.53	15.99	474.0	9.9	2.82	0.13	0.13
Miscellaneous Natural Gas or Propane Off Road	Hours of Operation	1000 hp-hr	10.40	10.06	275.6	11.9	1.50	0.13	0.13
Locomotives	Fuel Burned	1000 gal	36.00	34.46	115.0	659.0	47.35	15.50	14.88
Light Duty Gasoline On or Off Road	Distance Traveled	1000 vmt	2.92	2.67	18.8	2.3	0.12	0.47	0.21
Heavy Duty Diesel On Road	Distance Traveled	1000 vmt	4.21	4.10	17.4	29.1	0.94	4.62	4.02

Note that, for the above table, the ROG emission factors can be used as VOC emission factors, and the PM_{10} emission factors can be used as $PM_{2.5}$ emission factors.

Control Techniques:

None are presently quantified.

Source:

This method is consists of fleet average emission factors derived from the District emission inventory.

J. Dust Entrainment from Paved Roads

This procedure applies to all traffic on paved roads. This procedure estimates the dust entrainment due to vehicular travel on paved surfaces. Vehicular exhaust emissions should be estimated using methods presented elsewhere.

Least Complex:

This method consists of multiplying a conservative default emission factor for a typical haul truck operating on a material laden surface by an estimate of that haul trucks annual activity in vehicle mile traveled.

$$E = E_f \times V$$

E = Particulate matter emissions rate in pounds per year
E_f = Emission factor in units of pounds of pollutant per mile traveled
V = Annual travel in units of vehicle miles traveled

E_f (TSP) = 55 pounds/mile traveled
E_f (PM_{10}) = 11 pounds/mile traveled
E_f ($PM_{2.5}$) = 3 pounds/mile traveled
(These emission factors were calculated using the defaults given in the Most Complex section)

Paved Roads Table 1 -- Activity Based Emissions									
Activity (miles traveled)	500	1000	5000	10000	20000	50000	100000	150000	200000
TSP Emissions (tons)	13.75	27.50	137.50	275	550	1375	2750	4125	5500
PM10 Emissions (tons)	2.75	5.50	27.50	55	110	275	550	825	1100
PM2.5 Emissions (tons)	0.75	1.50	7.50	15	30	75	150	225	300

Most Complex:

This method calculates a vehicle-specific emission factor based on paved surface silt loading and vehicle weight, and multiplies it by annual vehicular activity in miles traveled.

$$E = E_f \times V \qquad E_f = k \times \left(\frac{sL}{2}\right)^{0.65} \times \left(\frac{W}{3}\right)^{1.5}$$

E = Particulate matter emissions rate in pounds per year
E_f = Emission factor in units of pounds of pollutant per mile traveled
V = Annual travel in units of vehicle miles traveled
k = Aerodynamic particle size multiplier (see below)
sL = Roadway silt loading, in grams per square meter
W = Mean vehicle weight in tons

k (TSP) = 0.082

k (PM_{10}) = 0.016
k ($PM_{2.5}$) = 0.004

Conservative silt loading default is 100 grams per square meter
Conservative mean vehicle weight default is 42 tons

Paved Roads Table 2 -- Default Silt Loadings	
Paved Surface	Silt Loading (g/m2)
Freeway or High Traffic	0.1
Low Traffic Road	0.4
Municipal Solid Waste Landfill	7
Quarry	8
Concrete Batching	12
Sand and Gravel Processing	70
Industrial Site	100
Asphalt Batching	120

Paved Roads Table 3 -- Emission Factors (Ef) for TSP							
Silt Loading (g/m2)	Mean Vehicle Weight (W) in tons						
	2.5	5.0	10.0	15.0	25.0	50.0	100.0
0.4	0.02	0.06	0.18	0.32	0.69	1.96	5.54
1.0	0.04	0.11	0.32	0.58	1.26	3.56	10.06
1.5	0.05	0.15	0.41	0.76	1.64	4.63	13.09
5.0	0.11	0.32	0.91	1.66	3.58	10.12	28.63
10.0	0.18	0.50	1.42	2.61	5.62	15.88	44.92
15.0	0.23	0.65	1.85	3.40	7.31	20.67	58.47
25.0	0.32	0.91	2.58	4.73	10.19	28.81	81.49
50.0	0.51	1.43	4.04	7.43	15.98	45.21	127.88
100.0	0.79	2.24	6.35	11.66	25.08	70.94	200.66
150.0	1.03	2.92	8.26	15.17	32.65	92.34	261.17
200.0	1.24	3.52	9.96	18.29	39.36	111.32	314.87

Paved Roads Table 4 -- Emission Factors (Ef) for PM10							
Silt Loading (g/m2)	Mean Vehicle Weight (W) in tons						
	2.5	5.0	10.0	15.0	25.0	50.0	100.0
0.4	0.00	0.01	0.03	0.06	0.14	0.38	1.08
1.0	0.01	0.02	0.06	0.11	0.25	0.69	1.96
1.5	0.01	0.03	0.08	0.15	0.32	0.90	2.55
5.0	0.02	0.06	0.18	0.32	0.70	1.97	5.59
10.0	0.03	0.10	0.28	0.51	1.10	3.10	8.77
15.0	0.05	0.13	0.36	0.66	1.43	4.03	11.41
25.0	0.06	0.18	0.50	0.92	1.99	5.62	15.90
50.0	0.10	0.28	0.79	1.45	3.12	8.82	24.95
100.0	0.15	0.44	1.24	2.27	4.89	13.84	39.15
150.0	0.20	0.57	1.61	2.96	6.37	18.02	50.96
200.0	0.24	0.69	1.94	3.57	7.68	21.72	61.44

Paved Roads Table 5 -- Emission Factors (Ef) for PM2.5							
Silt Loading (g/m2)	Mean Vehicle Weight (W) in tons						
	2.5	5.0	10.0	15.0	25.0	50.0	100.0
0.4	0.001	0.003	0.009	0.016	0.034	0.096	0.270
1.0	0.002	0.005	0.016	0.029	0.061	0.173	0.491
1.5	0.003	0.007	0.020	0.037	0.080	0.226	0.639
5.0	0.006	0.016	0.044	0.081	0.175	0.494	1.396
10.0	0.009	0.024	0.069	0.127	0.274	0.775	2.191
15.0	0.011	0.032	0.090	0.166	0.357	1.008	2.852
25.0	0.016	0.044	0.126	0.231	0.497	1.405	3.975
50.0	0.025	0.070	0.197	0.362	0.780	2.205	6.238
100.0	0.039	0.109	0.310	0.569	1.224	3.461	9.788
150.0	0.050	0.142	0.403	0.740	1.592	4.504	12.740
200.0	0.061	0.172	0.486	0.892	1.920	5.430	15.360

Control Techniques:

Several control techniques are effective in reducing dust entrainment emissions from paved surfaces. Broom sweeping provides a 20 percent control effectiveness. Vacuum sweeping with at least a 12,000 cfm blower provides 45 percent control effectiveness (30 percent for PM_{10} and $PM_{2.5}$). Water flushing can also be used, but at least 0.48 gallons per square yard (or 8448 gallons per mile of 30 foot road) must be used to qualify for the following control efficiencies:

Paved Road Table 6 -- Water Flushing Control Efficiency		
Method	Control Efficiency (%)	Discussion
Water flushing	69-(0.231*V)	V is the number of vehicle passes since the last water flush
Water flushing followed by sweeping	96-(0.263*V)	

Once the control efficiency of the applicable control technique is known, the following equation is used to determine the "controlled" emissions from the operation or process:

$$E_c = E \times \left(\frac{100 - C}{100} \right)$$

E_c = Controlled emissions
E = Uncontrolled emissions
C = Control efficiency in percent (%)

Source:

These methods were derived from the Paved Roads discussion in §13.2.1 of USEPA's AP-42 (October 1997 version).

K. Dust Entrainment from Unpaved Roads

This procedure applies to all traffic on unpaved roads. This procedure estimates the dust entrainment due to vehicular travel on unpaved surfaces. Vehicular exhaust emissions should be estimated using methods presented elsewhere.

Least Complex:

This method consists of a conservative default emission factor (based on average vehicle weight in tons) multiplied by an estimate of annual vehicular activity in miles traveled.

$$E = E_f \times V$$

E = Particulate matter emissions rate in pounds per year
E_f = Emission factor in units of pounds of particulate per mile traveled
V = Annual travel in units of vehicle miles traveled
(These emission factors were calculated using the defaults given in the Most Complex section)

Unpaved Road Table 1 -- Default Emission Factors (Ef) in pounds/vmt								
Average weight (tons):	3	5	10	20	50	100	150	200
TSP Emission Factor	9.33	12.04	17.03	24.08	38.08	53.85	65.96	76.16
PM10 Emission Factor	2.43	2.97	3.93	5.18	7.47	9.86	11.60	13.01
PM2.5 Emission Factor	0.35	0.43	0.57	0.76	1.09	1.44	1.69	1.90

Most Complex:

This method calculates a vehicle specific emission factor based on unpaved surface silt content in percent, average vehicle weight in tons, and unpaved surface moisture content in percent, and multiplies it by annual vehicular activity in miles traveled.

$$E = E_f \times V \qquad E_{f(TSP)} = 10 \times \left(\frac{s}{12}\right)^{0.8} \times \left(\frac{W}{3}\right)^{0.5} \times \left(\frac{M}{0.2}\right)^{-0.4}$$

$$E_{f(PM_{10})} = 2.6 \times \left(\frac{s}{12}\right)^{0.8} \times \left(\frac{W}{3}\right)^{0.4} \times \left(\frac{M}{0.2}\right)^{-0.3}$$

$$E_{f(PM_{2.5})} = 0.38 \times \left(\frac{s}{12}\right)^{0.8} \times \left(\frac{W}{3}\right)^{0.4} \times \left(\frac{M}{0.2}\right)^{-0.3}$$

E = Particulate matter emissions rate in pounds per year
E_f = Emission factor in units of pounds of pollutant per mile traveled
V = Annual travel in units of vehicle miles traveled (vmt)
s = Unpaved surface silt content in percent (%)
W = Average vehicle weight in tons

M = Unpaved surface moisture content in percent (%)

Unpaved Roads Table 2 -- Default Silt Content	
Source	Silt Loading (%)
Sand & gravel plant road	5
Landfill road	6
Rural road (gravel/crushed limestone surface)	6
Industrial haul road	8
Construction site scraper route	9
Stone quarrying and processing plant road	10
Rural road (dirt surface)	11
Coal mine scraper route	17
Coal mine freshly graded haul road	24

Conservative default silt content is 11 percent
Conservative default surface moisture content is 0.2 percent
Default average vehicle speed is assumed to be at least 15 mph

Control Techniques:

Several techniques are used to reduce fugitive dust emissions from vehicular travel on unpaved roads. The equation suggests that reducing travel, speed, and vehicle weight will directly reduce emissions. In addition, changing the nature of the unpaved surface can reduce emissions, as can be seen from the default silt loading table. Chemical stabilization is often used, but the control efficiency of chemical stabilization is very dependent on the material used and how it is applied; consult with the vendor and the District to derive a control efficiency for chemical stabilization (no control efficiency will be allowed for calcium chloride). Watering is the most common control technique for unpaved roads. What follows is an equation to calculate the control efficiency for a given water application rate:

$$C_f = 100 - \left(0.0012 \times \frac{A \times D \times T}{I}\right)$$

C_f = Control efficiency of watering application in percent
A = Average annual class A pan evaporation in inches
D = Average hourly traffic rate in vehicles per hour
T = Time between water applications in hours
I = Water application intensity in gallons per square yard

Conservative average annual evaporation is 75 inches
Conservative time between applications is 3 hours
Conservative watering intensity is 0.11 gal/yd^2 or 1936 gallons per mile of 30 foot road
(These defaults equate to no control efficiency for 41 vehicles per hour)

Once the control efficiency of the applicable control technique is known, the following equation is used to determine the “controlled” emissions from the operation or process:

$$E_c = E \times \left(\frac{100 - C}{100} \right)$$

E_c	=	Controlled emissions
E	=	Uncontrolled emissions
C	=	Control efficiency in percent (%)

Source:

These methods are presented in the Unpaved Roads discussion (§13.2.2) in USEPA’s AP-42 (September 1998).

L. Wind Erosion from Unpaved Operational Areas and Roads

This procedure applies to actively disturbed unpaved areas, specifically including plant or operational areas (such as quarries) and roads. Actively disturbed is defined as being disturbed by man's activity at least once per day. This procedure estimates the particulate emissions from these areas due to wind erosion. Particulate emissions due to actual vehicular travel on these areas should be estimated using methods presented elsewhere.

Least Complex:

This method multiplies a conservative emission factor by the amount of disturbed area.

$$E = E_f \times A$$

E = Particulate matter emission rate in tons per year
E_f = Emission factor in tons per acre (see below)
A = Disturbed area in acres

E_f (TSP) = 16 tons/acre
E_f (PM_{10}) = 8 tons/acre
E_f ($PM_{2.5}$) = 3.2 tons/acre

(These emission factors were calculated using the defaults given in the Intermediate Complexity section)

Wind Erosion Table 1 -- Area Based Emissions							
Area Disturbed (acres)	1	2	5	10	20	50	100
TSP Emissions (tons)	16	32	80	160	320	800	1600
PM10 Emissions (tons)	8	16	40	80	160	400	800
PM2.5 Emissions (tons)	3.2	6.4	16	32	64	160	320

Intermediate Complexity:

This method presents an equation requiring inputs for the fraction of vegetative cover on the disturbed area, mean wind speed in meters per second, threshold value of wind speed in meters per second (a derived value), and a correction factor (a derived value). The derived values can be estimated from tables presented below.

$$E = k \times E_f \times A \qquad Ef = 2.814 \times (1 - v) \times \left(\frac{u}{u_t}\right)^3 \times C(x) \qquad u_t = u_t^* \times u^*$$

E = Particulate matter emission rate in tons per year
k = Particulate aerodynamic factor (see below)
E_f = Emission factor in tons per acre
A = Disturbed area in acres
v = Amount of vegetative cover as a fraction
u = Mean wind speed in meters per second

u_t	=	Threshold value of wind speed in meters per second (calculated)
C(x)	=	Correction factor (see Table 4 below)
u^*_t	=	Threshold friction velocity in meters per second (see Table 2 below)
u*	=	Ratio of wind speed to friction velocity

k (TSP)	=	1.0
k (PM_{10})	=	0.5
k ($PM_{2.5}$)	=	0.2

Wind Erosion Table 2 -- Threshold Friction Velocity		
Area Use	Typical friction velocity particle size (mm)	Threshold friction velocity (m/s)
Mine tailings	0.05	0.14
Abandoned agricultural land	0.10	0.25
Construction site	0.11	0.26
Disturbed desert	0.20	0.33
Scrub desert	0.30	0.38
Coal dust	0.60	0.52
Active agricultural land	0.60	0.52
Coal pile	1.00	0.64

Wind Erosion Table 3 -- Ratio of wind speed to friction velocity		
Area use	Typical roughness height (cm)	Ratio
Open space	2	15.0
Light industrial	35	8.0
Moderate industrial	70	6.5
Heavy industrial	100	5.0

$$x = 0.886 \times \frac{u_t}{u}$$

Wind Erosion Table 4 -- C(x) Correction Factor																		
x	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
C(x)	1.91	1.90	1.89	1.86	1.83	1.77	1.70	1.60	1.48	1.33	1.20	1.05	0.90	0.78	0.62	0.50	0.40	0.29

Conservative default for mean wind speed is 2.36 m/s (7.7 mph)
Conservative default for roughness height is 70 cm (medium industry)
Conservative default for particle size is 0.1 mm (abandoned ag. land)

Most Complex:

This method presents an additional equation that is used as an alternative depending on the nature of the surface being eroded. Erodible surfaces can be characterized as “limited” or “unlimited” reservoirs of erodible material. The following table determines the type of surface and the appropriate equation:

Wind Erosion Table 5 -- Limited vs Unlimited		
	Reservoir Type	
Variable	Limited	Unlimited
Surface cover	Stones and/or clumps of vegetation	Bare with finely divided materials such as sand or soil
Threshold Frictional Velocity	Greater than 75 cm/s with particle size 1.5 mm or greater	Equal to or less than 75 cm/s with particle size less than 1.5 mm
Surface crust	Crust thicker than 0.25 inch and not easily crumbled between fingers (modulus of rupture > one bar)	Crust less than 0.25 inch or easily crumbled between fingers

If the surface in question is best characterized as an "unlimited" reservoir, use the moderate complexity method above.

The method for limited reservoirs involves a summation of the particulate emissions from each individual day in the year, based on each day's maximum wind speed in meters per second and the friction velocity of the surface in question. Those days without sufficient wind speed are ignored.

$$E = \frac{k \times \sum_{i=1}^{N}\left(9.813 \times A \times \left(58 \times (u_i - u_t)^2 + 25 \times (u_i - u_t)\right)\right)}{2000} \qquad u_i = 0.056 \times u_d$$

E = Particulate emissions in tons per year
k = Particulate aerodynamic multiplier (see below)
N = Number of days that daily maximum wind speed exceeded equivalent threshold friction velocity (threshold friction velocity multiplied by 17.9)
A = Disturbed area in acres (disturbed on a daily basis)
u_i = Friction velocity (at surface) in meters per second
u_t = Threshold friction velocity in meters per second (see Table 2)
u_d = Maximum wind speed of the *i*th day in meters/second (tower measurement)

k (TSP) = 1.0
k (PM_{10}) = 0.5
k ($PM_{2.5}$) = 0.2

Control Techniques:

Water spray is commonly used to reduce fugitive dust from unpaved surfaces. Water spray essentially increases the moisture content of the material. The control discussion presented in the previous section (unpaved roads) includes a method for estimating the control efficiency of watering. Other forms of stabilization can be used to reduce the erodibility of the unpaved surface and/or increase its threshold frictional velocity. For the most part, these control techniques will require case-by-case analysis, and review and approval of the District.

Once the control efficiency of the applicable control technique is known, the following equation is used to determine the "controlled" emissions from the operation or process:

$$E_c = E \times \left(\frac{100 - C}{100} \right)$$

E_c = Controlled emissions
E = Uncontrolled emissions
C = Control efficiency in percent (%)

Source:

These methods are presented in the Industrial Wind Erosion discussion (§13.2.5) in USEPA's AP-42 (January 1995).

Appendix G: Baseline Data from Omya

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS TOTAL EMISSIONS	FORM MINE TOTAL

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc   COMPANY NUMBER: 90

FACILITY NAME: Plant   FACILITY NUMBER: 461

TOTAL

EMISSION SOURCE / OPERATION / ACTIVITY	DEVICE ID #	CRITERIA EMISSIONS (tons per year)							
		TSP	PM_{10}	$PM_{2.5}$	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	90010	0.000	0.000	0.000					
BLASTING	90011	0.000	0.000	0.000					
EXPLOSIVES	90011				0.000	0.000	0.000		
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	90012a	0.102	0.050	0.015					
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	90006,7,8,9	0.004	0.002	0.001					
Ball Mill #1	2002	0.928	0.059	0.018					
Tertiary Crushing	757	19.092	1.240	0.382					
Roller Mill #1	763	1.986	0.133	0.042					
Roller Mill #2	763	1.465	0.092	0.029					
Roller Mill #3	3935	0.892	0.058	0.018					
Roller Mill #4	7674	0.884	0.057	0.018					
Surface Treating Plant	2003	0.006	0.001	0.000					
Rock Storage System/Plan	754	10.768	3.014	0.941					
Optical Sorter	763	0.010	0.007	0.002					
Coarse Product Storage System	2009	0.267	0.044	0.014					
Silo 81-70c	4967	0.320	0.045	0.014					
Bulk Loadout 82 System	2007	0.087	0.014	0.004					
Bulk Loadout 83 System	2009	0.016	0.003	0.001					
STOCKPILES - WIND EROSION	90015	1.057	0.529	0.211					
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	VARIOUS	0.026	0.025	0.025	0.066	0.263	0.003	0.003	0.070
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	90001,2	0.653	0.646	0.646	3.226	29.068	1.151	1.114	5.260
PAVED ROADS - ENTRAINED DUST	0	0.000	0.000	0.000					
UNPAVED ROADS - ENTRAINED DUST	90013	16.990	5.015	0.769					
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROADS	90014a	53.702	26.851	10.740					

	TSP	PM_{10}	$PM_{2.5}$	CO	NOx	TOG	ROG / VOC	SOx
GRAND TOTAL	109.255	37.883	13.891	3.291	29.332	1.154	1.117	5.331

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS FACILITY INFORMATION	FORM MINE FAC

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc
FACILITY NAME: Plant
FACILITY LOCATION (address): 7225 Crystal Creek Road
CITY: Lucerne Valley
STATE: CA ZIP: 92356

COMPANY NUMBER: 90
FACILITY NUMBER: 461
FACID: 9000461

MAILING ADDRESS: P.O. Box 825
CITY: Lucerne Valley
STATE: CA ZIP: 92356

CONTACT PERSON: Christine Granquist
TELEPHONE NUMBER: 760-248-5223 EXT:
FAX NUMBER: 760-248-9115
EMAIL: christine.granquist@omya.com

MINE TYPE AND PARAMETERS

TYPE OF MINE	Quarry	(Quarry, Surface, Pit, Bank Run, Shaft, Etc.)
TYPE OF MATERIAL MINED	Limestone	(Limestone, Talc, Salts, Sand, Gravel, Rock, Volcanic Cinders, Gold, Silver, Iron Ore, Rear Earth, Etc.)
OVERBURDEN RATIO	n/a	Tons of Overburden per Ton of Ore

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS MINERALS HANDLED - AMOUNT & CHARACTERISTICS	FORM MINE MIN

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc

FACILITY NAME: Plant

COMPANY NUMBER: 90

FACILITY NUMBER: 461

Name of Minerals	Amounts (tpy)		Characteristics	
	Shifted by Blasting	Total Handled	Moisture (%)	Silt (%)
Limestone	0	360,117	1.5	1.5
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
TOTAL	0	360,117		

EMISSION YEAR 200 **8**	HARP / CEIDARS MINING OPERATIONS METEOROLOGICAL DATA	FORM MINE MET-D

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc

FACILITY NAME: Plant

COMPANY NUMBER: 90

FACILITY NUMBER: 461

Parameter	Value	Description	Default Value
Mean Wind Speed	7.7	mph	7.7
u	3.4	meters per second	
Precipitation		Day per year with at least 0.01 inches of precipitation	20.0
Wind Speed	13.3	Percent of time with wind speed >12mph (%)	13.3
Evaporation	75.0	Annual Pan Evaporation Rate in inches	75.0

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS DRILLING AND BLASTING	FORM MINE D&B

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc — COMPANY NUMBER: 90

FACILITY NAME: Plant — FACILITY NUMBER: 461

Device ID# 90010 DRILLING

Device ID# 90011 BLASTING

Blast per year		number
Holes per Blast - Average		number
Holes drilled per year	0	Number of holes per year
Area Shifted per Blast - Average		square foot per blast - average
Area Shifted per Year	0	square foot per year
Amount shifted by blasting	0	Tons Ore, Waste & Overburden

EMISSIONS

DRILLING

Device ID# 90010

SCC 30502514

By Amount Shifted

Annual Throughput 0 Tons Shifted

Emission Factors (pounds per tons shifted)			Fractionation Value	
TSP	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
0.001	0.0008	0.0008	0.800	0.800

Controls

None, assumed wet drilling

Emissions - tons per year		
TSP	PM_{10}	$PM_{2.5}$
0.000	0.000	0.000

SCC 30502514

By Number of Holes Drilled

Annual Throughput 0 Holes Drilled

Emission Factors (pounds per hole drilled)			Fractionation Value	
TSP	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
1.3	0.68	0.68	0.523	0.523

Controls

None, assumed wet drilling

Emissions - tons per year		
TSP	PM_{10}	$PM_{2.5}$
0.000	0.000	0.000

BLASTING

Device ID# 90011

By Tons Shifted

Annual Throughput 0 Tons Shifted

SCC 30502514

Emission Factors (pounds per ton shifted)			Fractionation Value	
TSP	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
0.160	0.080	0.005	0.500	0.030

Controls

None

Emissions - tons per year Em = EmFac * Amount Shift		
TSP	PM_{10}	$PM_{2.5}$
0	0	0

By Square Foot Shifted

Area Shifted per Blast - Average 0 square foot per blast - average

Area Shifted per Year 0 square foot per year

SCC 30502514

Emission Factors (pounds per blast) *			Fractionation Value	
TSP	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
0.000	0.000	0.000	#DIV/0!	#DIV/0!

* $EmFac = k * 0.0005 * A^{1.5}$ 35.71428571

k = Aerodynamic Factor

TSP = 1.00

PM_{10} = 0.52

$PM_{2.5}$ = 0.03

A = Area Shifted per Blast - Average

Controls

None

Emissions - tons per year Em = EmFac * Blast per Year		
TSP	PM_{10}	$PM_{2.5}$
0.000	0.000	0.000

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS EXPLOSIVES	FORM MINE EXPL

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc   COMPANY NUMBER: 90
FACILITY NAME: Plant   FACILITY NUMBER: 461

Device ID# 90011

Code * See Codes below	Type	Composition	Amount tons/ year
	None	None	
	None	None	
	None	None	
	None	None	
	None	None	
	None	None	
	None	None	

* Codes for Explosive	
Code	Explosive
0	None
1	Black Powder
2	Smokeless Powder
3	Dynamite, Straight
4	Dynamite, Ammonia
5	Dynamite, Gelatin
6	ANFO
7	TNT
8	RDX
9	PETN
10	User Defined
11	User Defined
12	User Defined

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS EXPLOSIVES	FORM MINE EXPL

EMISSIONS

Device ID# 90011 SCC 30502514

Code	Explosive Type	Amount tons/ year	Emission Factor pounds per ton CO	NOx	TOG	Emission Rate ton per year CO	NOx	TOG
0	None	0.000	0	0	0	0.000	0.000	0.000
0	None	0.000	0	0	0	0.000	0.000	0.000
0	None	0.000	0	0	0	0.000	0.000	0.000
0	None	0.000	0	0	0	0.000	0.000	0.000
0	None	0.000	0	0	0	0.000	0.000	0.000
0	None	0.000	0	0	0	0.000	0.000	0.000
0	None	0.000	0	0	0	0.000	0.000	0.000
	INPUTS	0.000	#DIV/0!	#DIV/0!	#DIV/0!			
	Number of Devices	0						
					INPUTS	0.000	0.000	0.000

LOOKUP TABLE

Code	Explosive	Composition	Emission Factors Pounds per ton of explosive CO	NOx	TOG
0	None	None	0.0	0.0	0.0
1	Black Powder	Potassium Nitrate, Charcoal and Sulfur	170.0	0.0	4.2
2	Smokeless Powder	Nitrocellulose	77.0	0.0	1.1
3	Dynamite, Straight	Nitroglycerine, Sodium Nitrate, Wood Pulp, Calcium Carbonate	281.0	0.0	2.5
4	Dynamite, Ammonia	Nitroglycerine, Ammonium Nitrate, Sodium Nitrate, Wood Pulp	63.0	0.0	1.3
5	Dynamite, Gelatin	Nitroglycerine	104.0	53.0	0.7
6	ANFO	Ammonium Nitrate, Fuel Oil	67.0	17.0	0.0
7	TNT	Trinitrotoluene	796.0	0.0	14.3
8	RDX	Cyclotrimethylenetriittoamine	196.0	0.0	0.0
9	PETN	Pentaerythritol Tetranitrate	297.0	0.0	0.0
10	User Defined	User Defined	User Defined	User Defined	User Defined
11	User Defined	User Defined	User Defined	User Defined	User Defined
12	User Defined	User Defined	User Defined	User Defined	User Defined
13	Out of Range	Out of Range	Out of Range	Out of Range	Out of Range

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS BULLDOZING, SCRAPING AND GRADING OF MATERIAL	FORM MINE BSG

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc

FACILITY NAME: Plant

COMPANY NUMBER: 90

FACILITY NUMBER: 461

Device ID# 90012a

Name of Material	Hours of Operations (hours per year)					Controls			
	Bulldozing	Scraping	Grading	Other	Total	None	Water Spray		Wind Screen
						Check	Check	New Moisture (%)	Check
Limestone			253		253		x	3	
0					0				
0					0				
0					0				
0					0				
0					0				
0					0				
0					0				
0					0				
0					0				
0					0				
0					0				
0					0				
0					0				
0					0				

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS BULLDOZING, SCRAPING AND GRADING OF MATERIAL	FORM MINE BSG

EMISSIONS

Device ID# 90012a

SCC 30502599

Emission Factors (pounds per hours of operations)
EmFac = 2.76 * k *(s)^1.5 / (M)^1.4

k = Aerodynamic Factor
s = silt content (%)
M = Moisture content (%)

Aerodynamic factors
TSP = 0.74
PM_{10} = 0.36
$PM_{2.5}$ = 0.11

Material	Hours of Operations	Emission factors - Uncontrolled (pounds per hour)		
		TSP	PM_{10}	$PM_{2.5}$
Limestone	253	2.127	1.035	0.316
0	0	0.000	0.000	0.000
0	0	0.000	0.000	0.000
0	0	0.000	0.000	0.000
0	0	0.000	0.000	0.000
0	0	0.000	0.000	0.000
0	0	0.000	0.000	0.000
0	0	0.000	0.000	0.000
0	0	0.000	0.000	0.000
0	0	0.000	0.000	0.000
0	0	0.000	0.000	0.000
0	0	0.000	0.000	0.000
0	0	0.000	0.000	0.000
0	0	0.000	0.000	0.000
0	0	0.000	0.000	0.000
TOTAL	253	2.127	1.035	0.316
Number of Devices	1			

Fractionation Value	
PM_{10}	$PM_{2.5}$
0.486	0.149
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.486	0.149

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS BULLDOZING, SCRAPING AND GRADING OF MATERIAL	FORM MINE BSG

Material	Control		Emission factors - Controlled (pounds per hour)		
	Type	Efficiency (%)	TSP	PM_{10}	$PM_{2.5}$
Limestone	Water Spray	62.107	0.806	0.392	0.120
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
	TOTAL	62.11	0.806	0.392	0.120

Emissions - tons per year		
TSP	PM_{10}	$PM_{2.5}$
0.102	0.050	0.015
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000

	TSP	PM_{10}	$PM_{2.5}$
TOTAL	0.102	0.050	0.015

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS LOADING OF MATERIAL(S) AT MINE / QUARRY / PIT	FORM MINE LOAD

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc

FACILITY NAME: Plant

COMPANY NUMBER: 90

FACILITY NUMBER: 461

DEVICE # 90006,7,8,9

Name of Material	Amount Loaded tpy
Limestone	5,418
0	
0	
0	
0	
0	
0	
0	
0	
0	
0	
0	
0	
0	
0	

Controls						
None	Water Spray		Wind Screen	Other		
Check	Check	New Moisture (%)	Check	Check	Specify	Efficiency (%)
	x	2				

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS LOADING OF MATERIAL(S) AT MINE / QUARRY / PIT	FORM MINE LOAD

EMISSIONS

Device ID# 90006,7,8,9

SCC 30502506

Emission Factors (pounds per ton)
EmFac =0.0032 * k *(U/5)^1.3 / (M/2)^1.4

k = Aerodynamic Factor
U = Mean wind speed in miles per hour
M = Moisture content (%)

Aerodynamic factors

TSP =	0.74
PM_{10} =	0.36
$PM_{2.5}$ =	0.11

Material	Amount Loaded tpy
Limestone	5,418
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
TOTAL	5,418
Number of Devices	1

Emission factors - Uncontrolled (pounds per ton)		
TSP	PM_{10}	$PM_{2.5}$
0.002	0.001	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.002	0.001	0.000

Fractionation Value	
PM_{10}	$PM_{2.5}$
0.486	0.149
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.486	0.149

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS LOADING OF MATERIAL(S) AT MINE / QUARRY / PIT	FORM MINE LOAD

Material	Control		Emission factors - Controlled (pounds per ton)		
	Type	Efficiency (%)	TSP	PM_{10}	$PM_{2.5}$
Limestone	Water Spray	33.152	0.001	0.001	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
0	None	0.000	0.000	0.000	0.000
	TOTAL	33.15	0.001	0.001	0.000

	Emissions - tons per year		
	TSP	PM_{10}	$PM_{2.5}$
	0.004	0.002	0.001
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
TOTAL	0.004	0.002	0.001

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS AGGREGATE HANDLING, CRUSHING & SCREENING #1	FORM MINE AGG

I - COLOR CODE

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

II - MANDATORY INFORMATION

FLOW DIAGRAM
BLOCK III - ALL ITEMS
BLOCK VIII - ACTUAL HOURS OPERATED
BLOCK IX - ANNUAL THROUGHPUT (tpy)
BLOCK X - MOISTURE CONTENT (%) OF MATERIAL ENTERING THE SYSTEM
BLOCK XIII, COLUMNS 'B', 'E', 'F' & 'G'

III - FACILITY INFORMATION

COMPANY NAME	Omya California Inc	COMPANY #	90	PERMIT #	B 0 0 2 0 0 2
FACILITY NAME	Plant	FACILITY #	461	DEVICE ID	2002
PROCESS NAME	Ball Mill #1	INVENTORY ID #	9000461	PROCESS ID	

IV - MAP COORDINATES FOR PROCESS

UTM ZONE 11 UTM EAST (km) 5 0 5 . 3 1 6 UTM NORTH (km) 3 8 0 4 . 4 1 5
LATITUDE (deg.) 3 4 . 3 8 3 7 LONGITUDE (deg.) 1 1 6 . 9 4 2 2

V - TYPE OF PLANT

STATIONARY	x
PORTABLE	
OTHER	
COMMENTS	

VI - TYPE OF EQUIPMENT, check all that applies:

CRUSHERS	x	TRANSFER	x
SCREENS		STORAGE	
CONVEYORS	x	LOAD OUT	
OTHERS			
COMMENTS			

VII - MATERIAL TYPES check all that applies

ROCK	
SAND	
LIMESTONE	x
LAVA ROCK	
OTHER	

VIII - OPERATING SCHEDULE

HOURS per DAY	10
DAYS per WEEK	5
WEEK per YEAR	52
CAL. HRS per YR	2600
ACT. HRS per YR	2500

CAL. Hrs/Yr = Hr/Dy*Dy/Wk*Wk/Yr

IX - THROUGHPUT (tons per year)

ACTUAL ANNUAL	19,362	Tons/Yr.
HOURLY (average)	8	TPH
MAX. DESIGN RATE	50.0	TPH

Hourly (average) = Annual (actual) / Actual Hours per Year (operated)

X - MOISTURE CONTENT (%)

MOISTURE CONTENT ENTERING SYS.: 3 %

XI - TYPE OF OPERATION AND / OR DEVICE

CODE	NAME OF DEVICE OR SYSTEM	CODE	NAME OF DEVICE OR SYSTEM
0	No Device	11	Screening, Wet Washing (Note 4)
1	Dump to Hopper, truck, pile (Note 2)	12	Silo, Filling - Pneumatic
2	Grizzly (Note 2)	13	Silo, Filling - Bucket Elevator
3	Hopper (Note 2)	14	Silo, discharge to Conveyor (Note 2)
4	Transfer Point (Note 2)	15	Silo, discharge to Tank Truck
5	Conveyor (Note 2)	16	Loading Open Top Truck (Note 2)
6	Crushing, Dry - Primary	17	Feeder
7	Crushing, Dry - Secondary	18	See Lookup Table "EmFac" for data
8	Crushing, Dry - Tertiary	19	See Lookup Table "EmFac" for data
9	Crushing, Wet (Note 3)	20	See Lookup Table "EmFac" for data
10	Screening, Dry	21	See Lookup Table "EmFac" for data

XII - TYPE OF EMISSION CONTROL EQUIPMENT

CODE	TYPE OF CONTROL	CODE	TYPE OF CONTROL
0	None	11	Gravel Bed Filters
1	Water Spray, Point of Application	12	Spray Tower (Low Efficiency)
2	Spray with Additives, Point of Application	13	Wet Scrubber (Med Efficiency)
3	Conveyor with Half Cover	14	Venturi Scrubber (High Efficiency)
4	Conveyor with Three Quarter Cover	15	Baghouse with Multiple Pickups
5	Conveyor with Full Cover	16	Baghouse with Single Pickup (Unenclosed)
6	Process Enclosure	17	Baghouse with Single Pickup (Partial Enclosed)
7	Gravity Separator	18	Baghouse with Single Pickup (Full Enclosed)
8	Cyclone - Simple	19	Baghouse with Single Pickup (Attached)
9	Cyclone - Multiple	20	Electrostatic Precipitator
10	Windscreen, Windward Side	21	See Lookup Table "ConEff" for data

XIII - EMISSION CALCULATIONS

EQUIPMENT ID NUMBER (A)	DEVICE CODE NO (B)	NAME OF DEVICE (C)	MOTOR BHP (D)	THROUGHPUT TONS / YEAR (E)	EMISSION CONTROL DEVICE CODE (F)	DsF (G)	NAME OF DEVICE (H)	EFF % (I)	EMISSION FACTORS POUNDS PER TON PM_{30} (J)	PM_{10} (K)	$PM_{2.5}$ (L)	EMISSION RATE TONS PER YEAR PM_{30} (M)	PM_{10} (N)	$PM_{2.5}$ (O)
43-001	12	Silo, Filling - Pneumatic	NA	19,362	18		Baghouse with Single Pickup (Full En	99.0	0.270	0.016	0.005	0.03	0.00	0.00
43-005	17	Feeder	1.5	19,362	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
43-006	5	Conveyor (Note 2)	10	19,362	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
43-007	3	Hopper (Note 2)	NA	19,362	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
43-010	17	Feeder	5	19,362	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
43-011	8	Crushing, Dry - Tertiary	500	19,362	15		Baghouse with Multiple Pickups	95.0	1.850	0.112	0.035	0.90	0.05	0.02
43-027	17	Feeder	2	19,362	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
43-035	4	Transfer Point (Note 2)	50	19,362	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
43-043	4	Transfer Point (Note 2)	NA	19,362	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
43-049	17	Feeder	1	19,362	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
43-055	4	Transfer Point (Note 2)	15	19,362	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
43-050	17	Feeder	1.5	19,362	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
43-036	17	Feeder	1.5	7,744	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
43-037	5	Conveyor (Note 2)	10	7,744	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		TOTAL HORSEPOWER	597.5											
		AVERAGE THROUGHPUT PER DEVICE		17,702										

BLOCK XIV - EMISSIONS & HARP INPUTS

EMISSION INVENTORY INPUTS

DEVICE DATA

PERMIT ID	B002002
NUMBER OF DEVICES	14
EQUIPMENT SIZE (bhp)	597.5

PROCESS DATA

PROCESS RATE (tpy)	19,362
MAX. DESIGN RATE (tph)	50
MAX. HOURLY PRODUCTION RATE (tph)	50
AVE. HOURLY PRODUCTION RATE (tph)	8

EMISSION DATA

ANNUAL EMISSIONS (tpy)	PM	PM_{10}	$PM_{2.5}$
UNCONTROLLED	20.770	1.356	0.424
CONTROLLED	0.928	0.059	0.018
EMISSION FACTOR (lb/ton)			
UNCONTROLLED	2.1454	0.1400	0.0438
CONTROLLED	0.0958	0.0061	0.0019
FRACTIONATION VALUE (PM10 or PM2.5 / PM)		0.0632	0.0198
OVERALL EFFICIENCY	95.53	95.67	95.67

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS AGGREGATE HANDLING, CRUSHING & SCREENING #1	FORM MINE AGG

I - COLOR CODE: DATA INPUT BY FACILITY | DATA FROM ANOTHER WORKSHEET | OUTPUT DATA TO CEIDARS

II - MANDATORY INFORMATION
FLOW DIAGRAM
BLOCK III - ALL ITEMS
BLOCK VIII - ACTUAL HOURS OPERATED
BLOCK IX - ANNUAL THROUGHPUT (tpy)
BLOCK X - MOISTURE CONTENT (%) OF MATERIAL ENTERING THE SYSTEM
BLOCK XIII, COLUMNS 'B', 'E', 'F' & 'G'

III - FACILITY INFORMATION

COMPANY NAME	Omya California Inc	COMPANY #	90	PERMIT #	B 0 0 0 7 5 7
FACILITY NAME	Plant	FACILITY #	461	DEVICE ID	757
PROCESS NAME	Tertiary Crushing	INVENTORY ID #	9000461	PROCESS ID	

IV - MAP COORDINATES FOR PROCESS
UTM ZONE 11 UTM EAST (km) 5 0 5 . 3 1 6 UTM NORTH (km) 3 8 0 4 . 4 1 5
LATITUDE (deg.) 3 4 . 3 8 3 7 LONGITUDE (deg.) 1 1 6 . 9 4 2 2

V - TYPE OF PLANT		VI - TYPE OF EQUIPMENT, check all that applies:				VII - MATERIAL TYPES check all that applies		VIII - OPERATING SCHEDULE		IX - THROUGHPUT (tons per year)		
STATIONARY	x	CRUSHERS	x	TRANSFER	x	ROCK		HOURS per DAY	10	ACTUAL ANNUAL	365,535	Tons/Yr.
PORTABLE		SCREENS	x	STORAGE		SAND		DAYS per WEEK	5	HOURLY (average)	146	TPH
OTHER		CONVEYORS	x	LOAD OUT	x	LIMESTONE	x	WEEK per YEAR	52	MAX. DESIGN RATE	400.0	TPH
COMMENTS		OTHERS				LAVA ROCK		CAL. HRS per YR	2600	Hourly (average) = Annual (actual) / Actual Hours per Year (operated)		
		COMMENTS				OTHER		ACT. HRS per YR	2500	X - MOISTURE CONTENT (%)		
								CAL. Hrs/Yr = Hr/Dy*Dy/Wk*Wk/Yr		MOISTURE CONTENT ENTERING SYS.:	3	%

XI - TYPE OF OPERATION AND / OR DEVICE

CODE	NAME OF DEVICE OR SYSTEM	CODE	NAME OF DEVICE OR SYSTEM
0	No Device	11	Screening, Wet Washing (Note 4)
1	Dump to Hopper, truck, pile (Note 2)	12	Silo, Filling - Pneumatic
2	Grizzly (Note 2)	13	Silo, Filling - Bucket Elevator
3	Hopper (Note 2)	14	Silo, discharge to Conveyor (Note 2)
4	Transfer Point (Note 2)	15	Silo, discharge to Tank Truck
5	Conveyor (Note 2)	16	Loading Open Top Truck (Note 2)
6	Crushing, Dry - Primary	17	Feeder
7	Crushing, Dry - Secondary	18	See Lookup Table "EmFac" for data
8	Crushing, Dry - Tertiary	19	See Lookup Table "EmFac" for data
9	Crushing, Wet (Note 3)	20	See Lookup Table "EmFac" for data
10	Screening, Dry	21	See Lookup Table "EmFac" for data

XII - TYPE OF EMISSION CONTROL EQUIPMENT

CODE	TYPE OF CONTROL	CODE	TYPE OF CONTROL
0	None	11	Gravel Bed Filters
1	Water Spray, Point of Application	12	Spray Tower (Low Efficiency)
2	Spray with Additives, Point of Application	13	Wet Scrubber (Med Efficiency)
3	Conveyor with Half Cover	14	Venturi Scrubber (High Efficiency)
4	Conveyor with Three Quarter Cover	15	Baghouse with Multiple Pickups
5	Conveyor with Full Cover	16	Baghouse with Single Pickup (Unenclosed)
6	Process Enclosure	17	Baghouse with Single Pickup (Partial Enclosed)
7	Gravity Separator	18	Baghouse with Single Pickup (Full Enclosed)
8	Cyclone - Simple	19	Baghouse with Single Pickup (Attached)
9	Cyclone - Multiple	20	Electrostatic Precipitator
10	Windscreen, Windward Side	21	See Lookup Table "ConEff" for data

XIII - EMISSION CALCULATIONS

EQUIPMENT ID NUMBER (A)	DEVICE CODE NO (B)	NAME OF DEVICE (C)	MOTOR BHP (D)	THROUGHPUT TONS / YEAR (E)	EMISSION CONTROL DEVICE CODE (F)	DsF (G)	NAME OF DEVICE (H)	EFF % (I)	EMISSION FACTORS POUNDS PER TON PM_{30} (J)	PM_{10} (K)	$PM_{2.5}$ (L)	EMISSION RATE TONS PER YEAR PM_{30} (M)	PM_{10} (N)	$PM_{2.5}$ (O)
BH-1.1	4	Transfer Point (Note 2)	1	61,044	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
BH-1.2	4	Transfer Point (Note 2)	1	61,044	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
BH-1.3	4	Transfer Point (Note 2)	1	61,044	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
BH-1.4	4	Transfer Point (Note 2)	1	61,044	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
BH-1.5	4	Transfer Point (Note 2)	1	61,044	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
BH-1.6	4	Transfer Point (Note 2)	1	61,044	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
40-118	5	Conveyor (Note 2)	10	183,223	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.01	0.01	0.00
40-107	5	Conveyor (Note 2)	15	366,445	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.02	0.01	0.00
40-014	8	Crushing, Dry - Tertiary	300	366,445	15		Baghouse with Multiple Pickups	95.0	1.850	0.112	0.035	16.95	1.03	0.32
40-015	5	Conveyor (Note 2)	10	366,445	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.02	0.01	0.00
40-017	4	Transfer Point (Note 2)	NA	366,445	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.02	0.01	0.00
40-122	5	Conveyor (Note 2)	15	40,563	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
30	4	Transfer Point (Note 2)	NA	40,563	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
40-001	5	Conveyor (Note 2)	10	324,971	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.02	0.01	0.00
40-006	5	Conveyor (Note 2)	7.5	324,971	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.02	0.01	0.00
40-007	5	Conveyor (Note 2)	3	324,971	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.02	0.01	0.00
40-008	13	Silo, Filling - Bucket Elevator	30	324,971	15		Baghouse with Multiple Pickups	95.0	0.240	0.015	0.004	1.95	0.12	0.03
40-009	4	Transfer Point (Note 2)	0.5	324,971	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.02	0.01	0.00
40-010	4	Transfer Point (Note 2)	NA	180,164	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.01	0.01	0.00
40-011	5	Conveyor (Note 2)	3	86,309	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.01	0.00	0.00
		TOTAL HORSEPOWER	410											
		AVERAGE THROUGHPUT PER DEVICE		199,386										

BLOCK XIV - EMISSIONS & HARP INPUTS

EMISSION INVENTORY INPUTS

DEVICE DATA

PERMIT ID	B000757
NUMBER OF DEVICES	20
EQUIPMENT SIZE (bhp)	410

PROCESS DATA

PROCESS RATE (tpy)	365,535
MAX. DESIGN RATE (tph)	400
MAX. HOURLY PRODUCTION RATE (tph)	400
AVE. HOURLY PRODUCTION RATE (tph)	146

EMISSION DATA

ANNUAL EMISSIONS (tpy)	PM	PM_{10}	$PM_{2.5}$
UNCONTROLLED	381.836	24.792	7.639
CONTROLLED	19.092	1.240	0.382
EMISSION FACTOR (lb/ton)			
UNCONTROLLED	2.0892	0.1357	0.0418
CONTROLLED	0.1045	0.0068	0.0021
FRACTIONATION VALUE (PM10 or PM2.5 / PM)		0.0649	0.0200
OVERALL EFFICIENCY	95.00	95.00	95.00

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS AGGREGATE HANDLING, CRUSHING & SCREENING #1	FORM MINE AGG

I - COLOR CODE: DATA INPUT BY FACILITY | DATA FROM ANOTHER WORKSHEET | OUTPUT DATA TO CEIDARS

II - MANDATORY INFORMATION
FLOW DIAGRAM
BLOCK III - ALL ITEMS
BLOCK VIII - ACTUAL HOURS OPERATED
BLOCK IX - ANNUAL THROUGHPUT (tpy)
BLOCK X - MOISTURE CONTENT (%) OF MATERIAL ENTERING THE SYSTEM
BLOCK XIII, COLUMNS 'B', 'E', 'F' & 'G'

III - FACILITY INFORMATION

COMPANY NAME	Omya California Inc	COMPANY #	90	PERMIT #	B 0 0 0 7 6 3
FACILITY NAME	Plant	FACILITY #	461	DEVICE ID	763
PROCESS NAME	Roller Mill #1	INVENTORY ID #	9000461	PROCESS ID	

IV - MAP COORDINATES FOR PROCESS
UTM ZONE 11 UTM EAST (km) 5 0 5 . 3 1 6 UTM NORTH (km) 3 8 0 4 . 4 1 5
LATITUDE (deg.) 3 4 . 3 8 3 7 LONGITUDE (deg.) 1 1 6 . 9 4 2 2

V - TYPE OF PLANT
STATIONARY x
PORTABLE
OTHER
COMMENTS

VI - TYPE OF EQUIPMENT, check all that applies:
CRUSHERS x TRANSFER x
SCREENS STORAGE x
CONVEYORS x LOAD OUT
OTHERS
COMMENTS

VII - MATERIAL TYPES check all that applies
ROCK
SAND
LIMESTONE x
LAVA ROCK
OTHER

VIII - OPERATING SCHEDULE
HOURS per DAY 10
DAYS per WEEK 5
WEEK per YEAR 52
CAL. HRS per YR 2600
ACT. HRS per YR 2500
CAL. Hrs/Yr = Hr/Dy*Dy/Wk*Wk/Yr

IX - THROUGHPUT (tons per year)
ACTUAL ANNUAL 36,873 Tons/Yr.
HOURLY (average) 15 TPH
MAX. DESIGN RATE 50.0 TPH
Hourly (average) = Annual (actual) / Actual Hours per Year (operated)

X - MOISTURE CONTENT (%)
MOISTURE CONTENT ENTERING SYS.: 3 %

XI - TYPE OF OPERATION AND / OR DEVICE

CODE	NAME OF DEVICE OR SYSTEM	CODE	NAME OF DEVICE OR SYSTEM
0	No Device	11	Screening, Wet Washing (Note 4)
1	Dump to Hopper, truck, pile (Note 2)	12	Silo, Filling - Pneumatic
2	Grizzly (Note 2)	13	Silo, Filling - Bucket Elevator
3	Hopper (Note 2)	14	Silo, discharge to Conveyor (Note 2)
4	Transfer Point (Note 2)	15	Silo, discharge to Tank Truck
5	Conveyor (Note 2)	16	Loading Open Top Truck (Note 2)
6	Crushing, Dry - Primary	17	Feeder
7	Crushing, Dry - Secondary	18	See Lookup Table "EmFac" for data
8	Crushing, Dry - Tertiary	19	See Lookup Table "EmFac" for data
9	Crushing, Wet (Note 3)	20	See Lookup Table "EmFac" for data
10	Screening, Dry	21	See Lookup Table "EmFac" for data

XII - TYPE OF EMISSION CONTROL EQUIPMENT

CODE	TYPE OF CONTROL	CODE	TYPE OF CONTROL
0	None	11	Gravel Bed Filters
1	Water Spray, Point of Application	12	Spray Tower (Low Efficiency)
2	Spray with Additives, Point of Application	13	Wet Scrubber (Med Efficiency)
3	Conveyor with Half Cover	14	Venturi Scrubber (High Efficiency)
4	Conveyor with Three Quarter Cover	15	Baghouse with Multiple Pickups
5	Conveyor with Full Cover	16	Baghouse with Single Pickup (Unenclosed)
6	Process Enclosure	17	Baghouse with Single Pickup (Partial Enclosed)
7	Gravity Separator	18	Baghouse with Single Pickup (Full Enclosed)
8	Cyclone - Simple	19	Baghouse with Single Pickup (Attached)
9	Cyclone - Multiple	20	Electrostatic Precipitator
10	Windscreen, Windward Side	21	See Lookup Table "ConEff" for data

XIII - EMISSION CALCULATIONS

EQUIPMENT ID NUMBER (A)	DEVICE CODE NO (B)	NAME OF DEVICE (C)	MOTOR BHP (D)	THROUGHPUT TONS / YEAR (E)	EMISSION CONTROL DEVICE CODE (F)	DsF (G)	NAME OF DEVICE (H)	EFF % (I)	EMISSION FACTORS POUNDS PER TON PM_{30} (J)	PM_{10} (K)	$PM_{2.5}$ (L)	EMISSION RATE TONS PER YEAR PM_{30} (M)	PM_{10} (N)	$PM_{2.5}$ (O)
41-001	12	Silo, Filling - Pneumatic	NA	36,873	15		Baghouse with Multiple Pickups	95.0	0.270	0.016	0.005	0.25	0.01	0.00
41-008	17	Feeder	5	36,873	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
41-009	8	Crushing, Dry - Tertiary	250	36,873	15		Baghouse with Multiple Pickups	95.0	1.850	0.112	0.035	1.71	0.10	0.03
41-010,12	0	No Device	300	0	0		None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
41-011	4	Transfer Point (Note 2)	NA	36,873	8		Cyclone - Simple	50.0	0.002	0.001	0.000	0.02	0.01	0.00
41-024	4	Transfer Point (Note 2)	4.5	36,873	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
41-025	5	Conveyor (Note 2)	2	13,684	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
41-040	17	Feeder	NA	13,684	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
41-042	4	Transfer Point (Note 2)	210	13,684	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
41-029	4	Transfer Point (Note 2)	2	36,873	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
41-044	4	Transfer Point (Note 2)	NA	2,686	9		Cyclone - Multiple	66.0	0.002	0.001	0.000	0.00	0.00	0.00
41-051	4	Transfer Point (Note 2)	1.5	2,686	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
41-041	4	Transfer Point (Note 2)	2	2,686	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
		TOTAL HORSEPOWER	777											
		AVERAGE THROUGHPUT PER DEVICE		20,796										

BLOCK XIV - EMISSIONS & HARP INPUTS

EMISSION INVENTORY INPUTS

DEVICE DATA

PERMIT ID	B000763
NUMBER OF DEVICES	13
EQUIPMENT SIZE (bhp)	777

PROCESS DATA

PROCESS RATE (tpy)	36,873
MAX. DESIGN RATE (tph)	50
MAX. HOURLY PRODUCTION RATE (tph)	50
AVE. HOURLY PRODUCTION RATE (tph)	15

EMISSION DATA

ANNUAL EMISSIONS (tpy)	PM	PM_{10}	$PM_{2.5}$
UNCONTROLLED	39.317	2.469	0.772
CONTROLLED	1.986	0.133	0.042
EMISSION FACTOR (lb/ton)			
UNCONTROLLED	2.1325	0.1339	0.0419
CONTROLLED	0.1077	0.0072	0.0023
FRACTIONATION VALUE (PM10 or PM2.5 / PM)		0.0670	0.0210
OVERALL EFFICIENCY	94.95	94.61	94.61

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS AGGREGATE HANDLING, CRUSHING & SCREENING #1	FORM MINE AGG

I - COLOR CODE: DATA INPUT BY FACILITY | DATA FROM ANOTHER WORKSHEET | OUTPUT DATA TO CEIDARS

II - MANDATORY INFORMATION
FLOW DIAGRAM
BLOCK III - ALL ITEMS
BLOCK VIII - ACTUAL HOURS OPERATED
BLOCK IX - ANNUAL THROUGHPUT (tpy)
BLOCK X - MOISTURE CONTENT (%) OF MATERIAL ENTERING THE SYSTEM
BLOCK XIII, COLUMNS 'B', 'E', 'F' & 'G'

III - FACILITY INFORMATION

COMPANY NAME	Omya California Inc	COMPANY #	90	PERMIT #	B 0 0 0 7 6 3
FACILITY NAME	Plant	FACILITY #	461	DEVICE ID	763
PROCESS NAME	Roller Mill #2	INVENTORY ID #	9000461	PROCESS ID	

IV - MAP COORDINATES FOR PROCESS
UTM ZONE 11 UTM EAST (km) 5 0 5 . 3 1 6 UTM NORTH (km) 3 8 0 4 . 4 1 5
LATITUDE (deg.) 3 4 . 3 8 3 7 LONGITUDE (deg.) 1 1 6 . 9 4 2 2

V - TYPE OF PLANT
STATIONARY x
PORTABLE
OTHER
COMMENTS

VI - TYPE OF EQUIPMENT, check all that applies:
CRUSHERS x TRANSFER x
SCREENS STORAGE x
CONVEYORS x LOAD OUT
OTHERS
COMMENTS

VII - MATERIAL TYPES check all that applies
ROCK
SAND
LIMESTONE x
LAVA ROCK
OTHER

VIII - OPERATING SCHEDULE
HOURS per DAY 10
DAYS per WEEK 5
WEEK per YEAR 52
CAL. HRS per YR 2600
ACT. HRS per YR 2500
CAL. Hrs/Yr = Hr/Dy*Dy/Wk*Wk/Yr

IX - THROUGHPUT (tons per year)
ACTUAL ANNUAL 146,708 Tons/Yr.
HOURLY (average) 59 TPH
MAX. DESIGN RATE 100.0 TPH
Hourly (average) = Annual (actual) / Actual Hours per Year (operated)

X - MOISTURE CONTENT (%)
MOISTURE CONTENT ENTERING SYS.: 3 %

XI - TYPE OF OPERATION AND / OR DEVICE

CODE	NAME OF DEVICE OR SYSTEM	CODE	NAME OF DEVICE OR SYSTEM
0	No Device	11	Screening, Wet Washing (Note 4)
1	Dump to Hopper, truck, pile (Note 2)	12	Silo, Filling - Pneumatic
2	Grizzly (Note 2)	13	Silo, Filling - Bucket Elevator
3	Hopper (Note 2)	14	Silo, discharge to Conveyor (Note 2)
4	Transfer Point (Note 2)	15	Silo, discharge to Tank Truck
5	Conveyor (Note 2)	16	Loading Open Top Truck (Note 2)
6	Crushing, Dry - Primary	17	Feeder
7	Crushing, Dry - Secondary	18	See Lookup Table "EmFac" for data
8	Crushing, Dry - Tertiary	19	See Lookup Table "EmFac" for data
9	Crushing, Wet (Note 3)	20	See Lookup Table "EmFac" for data
10	Screening, Dry	21	See Lookup Table "EmFac" for data

XII - TYPE OF EMISSION CONTROL EQUIPMENT

CODE	TYPE OF CONTROL	CODE	TYPE OF CONTROL
0	None	11	Gravel Bed Filters
1	Water Spray, Point of Application	12	Spray Tower (Low Efficiency)
2	Spray with Additives, Point of Application	13	Wet Scrubber (Med Efficiency)
3	Conveyor with Half Cover	14	Venturi Scrubber (High Efficiency)
4	Conveyor with Three Quarter Cover	15	Baghouse with Multiple Pickups
5	Conveyor with Full Cover	16	Baghouse with Single Pickup (Unenclosed)
6	Process Enclosure	17	Baghouse with Single Pickup (Partial Enclosed)
7	Gravity Separator	18	Baghouse with Single Pickup (Full Enclosed)
8	Cyclone - Simple	19	Baghouse with Single Pickup (Attached)
9	Cyclone - Multiple	20	Electrostatic Precipitator
10	Windscreen, Windward Side	21	See Lookup Table "ConEff" for data

XIII - EMISSION CALCULATIONS

EQUIPMENT ID NUMBER (A)	DEVICE CODE NO (B)	NAME OF DEVICE (C)	MOTOR BHP (D)	THROUGHPUT TONS / YEAR (E)	EMISSION CONTROL DEVICE CODE (F)	DsF (G)	NAME OF DEVICE (H)	EFF % (I)	EMISSION FACTORS POUNDS PER TON PM_{30} (J)	PM_{10} (K)	$PM_{2.5}$ (L)	EMISSION RATE TONS PER YEAR PM_{30} (M)	PM_{10} (N)	$PM_{2.5}$ (O)
42-001	12	Silo, Filling - Pneumatic	NA	146,708	19		Baghouse with Single Pickup (Attach	99.5	0.270	0.016	0.005	0.10	0.01	0.00
42-003	4	Transfer Point (Note 2)	2	146,708	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
42-008	17	Feeder	5	146,708	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
42-010, 12	0	No Device	300	0	0		None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
42-009	8	Crushing, Dry - Tertiary	350	146,708	18		Baghouse with Single Pickup (Full En	99.0	1.850	0.112	0.035	1.36	0.08	0.03
42-011	4	Transfer Point (Note 2)	NA	146,708	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
42-034	4	Transfer Point (Note 2)	1.5	146,708	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
41-037	4	Transfer Point (Note 2)	NA	146,708	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
		TOTAL HORSEPOWER	658.5											
		AVERAGE THROUGHPUT PER DEVICE		128,370										

BLOCK XIV - EMISSIONS & HARP INPUTS

EMISSION INVENTORY INPUTS

DEVICE DATA

PERMIT ID	B000763
NUMBER OF DEVICES	8
EQUIPMENT SIZE (bhp)	658.5

PROCESS DATA

PROCESS RATE (tpy)	146,708
MAX. DESIGN RATE (tph)	100
MAX. HOURLY PRODUCTION RATE (tph)	100
AVE. HOURLY PRODUCTION RATE (tph)	59

EMISSION DATA

ANNUAL EMISSIONS (tpy)	PM	PM_{10}	$PM_{2.5}$
UNCONTROLLED	156.374	9.798	3.062
CONTROLLED	1.465	0.092	0.029
EMISSION FACTOR (lb/ton)			
UNCONTROLLED	2.1318	0.1336	0.0417
CONTROLLED	0.0200	0.0013	0.0004
FRACTIONATION VALUE (PM10 or PM2.5 / PM)		0.0629	0.0197
OVERALL EFFICIENCY	99.06	99.06	99.06

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS AGGREGATE HANDLING, CRUSHING & SCREENING #1	FORM MINE AGG

I - COLOR CODE: DATA INPUT BY FACILITY | DATA FROM ANOTHER WORKSHEET | OUTPUT DATA TO CEIDARS

II - MANDATORY INFORMATION
FLOW DIAGRAM
BLOCK III - ALL ITEMS
BLOCK VIII - ACTUAL HOURS OPERATED
BLOCK IX - ANNUAL THROUGHPUT (tpy)
BLOCK X - MOISTURE CONTENT (%) OF MATERIAL ENTERING THE SYSTEM
BLOCK XIII, COLUMNS 'B', 'E', 'F' & 'G'

III - FACILITY INFORMATION

COMPANY NAME	Omya California Inc	COMPANY #	90	PERMIT #	B 0 0 3 9 3 5
FACILITY NAME	Plant	FACILITY #	461	DEVICE ID	3935
PROCESS NAME	Roller Mill #3	INVENTORY ID #	9000461	PROCESS ID	

IV - MAP COORDINATES FOR PROCESS
UTM ZONE 11 UTM EAST (km) 5 0 5 . 3 1 6 UTM NORTH (km) 3 8 0 4 . 4 1 5
LATITUDE (deg.) 3 4 . 3 8 3 7 LONGITUDE (deg.) 1 1 6 . 9 4 2 2

V - TYPE OF PLANT: STATIONARY x; PORTABLE; OTHER; COMMENTS

VI - TYPE OF EQUIPMENT, check all that applies: CRUSHERS x; SCREENS; CONVEYORS x; OTHERS; COMMENTS; TRANSFER x; STORAGE x; LOAD OUT

VII - MATERIAL TYPES check all that applies: ROCK; SAND; LIMESTONE x; LAVA ROCK; OTHER

VIII - OPERATING SCHEDULE
HOURS per DAY 10
DAYS per WEEK 5
WEEK per YEAR 52
CAL. HRS per YR 2600
ACT. HRS per YR 2500
CAL. Hrs/Yr = Hr/Dy*Dy/Wk*Wk/Yr

IX - THROUGHPUT (tons per year)
ACTUAL ANNUAL 88,986 Tons/Yr.
HOURLY (average) 36 TPH
MAX. DESIGN RATE 100.0 TPH
Hourly (average) = Annual (actual) / Actual Hours per Year (operated)

X - MOISTURE CONTENT (%)
MOISTURE CONTENT ENTERING SYS.: 3 %

XI - TYPE OF OPERATION AND / OR DEVICE

CODE	NAME OF DEVICE OR SYSTEM	CODE	NAME OF DEVICE OR SYSTEM
0	No Device	11	Screening, Wet Washing (Note 4)
1	Dump to Hopper, truck, pile (Note 2)	12	Silo, Filling - Pneumatic
2	Grizzly (Note 2)	13	Silo, Filling - Bucket Elevator
3	Hopper (Note 2)	14	Silo, discharge to Conveyor (Note 2)
4	Transfer Point (Note 2)	15	Silo, discharge to Tank Truck
5	Conveyor (Note 2)	16	Loading Open Top Truck (Note 2)
6	Crushing, Dry - Primary	17	Feeder
7	Crushing, Dry - Secondary	18	See Lookup Table "EmFac" for data
8	Crushing, Dry - Tertiary	19	See Lookup Table "EmFac" for data
9	Crushing, Wet (Note 3)	20	See Lookup Table "EmFac" for data
10	Screening, Dry	21	See Lookup Table "EmFac" for data

XII - TYPE OF EMISSION CONTROL EQUIPMENT

CODE	TYPE OF CONTROL	CODE	TYPE OF CONTROL
0	None	11	Gravel Bed Filters
1	Water Spray, Point of Application	12	Spray Tower (Low Efficiency)
2	Spray with Additives, Point of Application	13	Wet Scrubber (Med Efficiency)
3	Conveyor with Half Cover	14	Venturi Scrubber (High Efficiency)
4	Conveyor with Three Quarter Cover	15	Baghouse with Multiple Pickups
5	Conveyor with Full Cover	16	Baghouse with Single Pickup (Unenclosed)
6	Process Enclosure	17	Baghouse with Single Pickup (Partial Enclosed)
7	Gravity Separator	18	Baghouse with Single Pickup (Full Enclosed)
8	Cyclone - Simple	19	Baghouse with Single Pickup (Attached)
9	Cyclone - Multiple	20	Electrostatic Precipitator
10	Windscreen, Windward Side	21	See Lookup Table "ConEff" for data

XIII - EMISSION CALCULATIONS

EQUIPMENT ID NUMBER (A)	DEVICE CODE NO (B)	NAME OF DEVICE (C)	MOTOR BHP (D)	THROUGHPUT TONS / YEAR (E)	EMISSION CONTROL DEVICE CODE (F)	DsF (G)	NAME OF DEVICE (H)	EFF % (I)	EMISSION FACTORS POUNDS PER TON PM_{30} (J)	PM_{10} (K)	$PM_{2.5}$ (L)	EMISSION RATE TONS PER YEAR PM_{30} (M)	PM_{10} (N)	$PM_{2.5}$ (O)
44-010	12	Silo, Filling - Pneumatic	NA	88,986	19		Baghouse with Single Pickup (Attach	99.5	0.270	0.016	0.005	0.06	0.00	0.00
44-013	17	Feeder	5	88,986	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
44-019	5	Conveyor (Note 2)	5	88,986	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
44-021,29	0	No Device	310	0	0		None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
44-020	8	Crushing, Dry - Tertiary	250	88,986	18		Baghouse with Single Pickup (Full En	99.0	1.850	0.112	0.035	0.82	0.05	0.02
44-037	4	Transfer Point (Note 2)	NA	88,986	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
44-038	17	Feeder	1.5	88,986	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
44-039	5	Conveyor (Note 2)	2.5	88,986	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
44-045	4	Transfer Point (Note 2)	2.5	81,173	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
44-053	4	Transfer Point (Note 2)	2.5	68,117	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
44-041	4	Transfer Point (Note 2)	50	68,117	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
44-043	17	Feeder	2.5	68,117	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
44-047	4	Transfer Point (Note 2)	NA	7,812	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
44-050	17	Feeder	2.5	7,812	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
		TOTAL HORSEPOWER	634											
		AVERAGE THROUGHPUT PER DEVICE		66,004										

BLOCK XIV - EMISSIONS & HARP INPUTS

EMISSION INVENTORY INPUTS

DEVICE DATA

PERMIT ID	B003935
NUMBER OF DEVICES	14
EQUIPMENT SIZE (bhp)	634

PROCESS DATA

PROCESS RATE (tpy)	88,986
MAX. DESIGN RATE (tph)	100
MAX. HOURLY PRODUCTION RATE (tph)	100
AVE. HOURLY PRODUCTION RATE (tph)	36

EMISSION DATA

	PM	PM_{10}	$PM_{2.5}$
ANNUAL EMISSIONS (tpy)			
UNCONTROLLED	95.203	6.110	1.910
CONTROLLED	0.892	0.058	0.018
EMISSION FACTOR (lb/ton)			
UNCONTROLLED	2.1397	0.1373	0.0429
CONTROLLED	0.0200	0.0013	0.0004
FRACTIONATION VALUE (PM10 or PM2.5 / PM)		0.0645	0.0202
OVERALL EFFICIENCY	99.06	99.06	99.06

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS AGGREGATE HANDLING, CRUSHING & SCREENING #1	FORM MINE AGG

I - COLOR CODE: DATA INPUT BY FACILITY | DATA FROM ANOTHER WORKSHEET | OUTPUT DATA TO CEIDARS

II - MANDATORY INFORMATION
- FLOW DIAGRAM
- BLOCK III - ALL ITEMS
- BLOCK VIII - ACTUAL HOURS OPERATED
- BLOCK IX - ANNUAL THROUGHPUT (tpy)
- BLOCK X - MOISTURE CONTENT (%) OF MATERIAL ENTERING THE SYSTEM
- BLOCK XIII, COLUMNS 'B', 'E', 'F' & 'G'

III - FACILITY INFORMATION

COMPANY NAME	Omya California Inc	COMPANY #	90	PERMIT #	B 0 0 7 6 7 4
FACILITY NAME	Plant	FACILITY #	461	DEVICE ID	7674
PROCESS NAME	Roller Mill #4	INVENTORY ID #	9000461	PROCESS ID	

IV - MAP COORDINATES FOR PROCESS

UTM ZONE 11 UTM EAST (km) 5 0 5 . 3 1 6 UTM NORTH (km) 3 8 0 4 . 4 1 5
LATITUDE (deg.) 3 4 . 3 8 3 7 LONGITUDE (deg.) 1 1 6 . 9 4 2 2

V - TYPE OF PLANT		VI - TYPE OF EQUIPMENT, check all that applies:				VII - MATERIAL TYPES check all that applies		VIII - OPERATING SCHEDULE	
STATIONARY	x	CRUSHERS	x	TRANSFER	x	ROCK		HOURS per DAY	10
PORTABLE		SCREENS		STORAGE	x	SAND		DAYS per WEEK	5
OTHER		CONVEYORS	x	LOAD OUT		LIMESTONE	x	WEEK per YEAR	52
COMMENTS		OTHERS				LAVA ROCK		CAL. HRS per YR	2600
		COMMENTS				OTHER		ACT. HRS per YR	2500

CAL. Hrs/Yr = Hr/Dy*Dy/Wk*Wk/Yr

IX - THROUGHPUT (tons per year)

ACTUAL ANNUAL	88,119	Tons/Yr.
HOURLY (average)	35	TPH
MAX. DESIGN RATE	100.0	TPH

Hourly (average) = Annual (actual) / Actual Hours per Year (operated)

X - MOISTURE CONTENT (%)

MOISTURE CONTENT ENTERING SYS.: 3 %

XI - TYPE OF OPERATION AND / OR DEVICE

CODE	NAME OF DEVICE OR SYSTEM	CODE	NAME OF DEVICE OR SYSTEM
0	No Device	11	Screening, Wet Washing (Note 4)
1	Dump to Hopper, truck, pile (Note 2)	12	Silo, Filling - Pneumatic
2	Grizzly (Note 2)	13	Silo, Filling - Bucket Elevator
3	Hopper (Note 2)	14	Silo, discharge to Conveyor (Note 2)
4	Transfer Point (Note 2)	15	Silo, discharge to Tank Truck
5	Conveyor (Note 2)	16	Loading Open Top Truck (Note 2)
6	Crushing, Dry - Primary	17	Feeder
7	Crushing, Dry - Secondary	18	See Lookup Table "EmFac" for data
8	Crushing, Dry - Tertiary	19	See Lookup Table "EmFac" for data
9	Crushing, Wet (Note 3)	20	See Lookup Table "EmFac" for data
10	Screening, Dry	21	See Lookup Table "EmFac" for data

XII - TYPE OF EMISSION CONTROL EQUIPMENT

CODE	TYPE OF CONTROL	CODE	TYPE OF CONTROL
0	None	11	Gravel Bed Filters
1	Water Spray, Point of Application	12	Spray Tower (Low Efficiency)
2	Spray with Additives, Point of Application	13	Wet Scrubber (Med Efficiency)
3	Conveyor with Half Cover	14	Venturi Scrubber (High Efficiency)
4	Conveyor with Three Quarter Cover	15	Baghouse with Multiple Pickups
5	Conveyor with Full Cover	16	Baghouse with Single Pickup (Unenclosed)
6	Process Enclosure	17	Baghouse with Single Pickup (Partial Enclosed)
7	Gravity Separator	18	Baghouse with Single Pickup (Full Enclosed)
8	Cyclone - Simple	19	Baghouse with Single Pickup (Attached)
9	Cyclone - Multiple	20	Electrostatic Precipitator
10	Windscreen, Windward Side	21	See Lookup Table "ConEff" for data

XIII - EMISSION CALCULATIONS

EQUIPMENT ID NUMBER (A)	DEVICE CODE NO (B)	NAME OF DEVICE (C)	MOTOR BHP (D)	THROUGHPUT TONS / YEAR (E)	EMISSION CONTROL DEVICE CODE (F)	DsF (G)	NAME OF DEVICE (H)	EFF % (I)	EMISSION FACTORS POUNDS PER TON PM_{30} (J)	PM_{10} (K)	$PM_{2.5}$ (L)	EMISSION RATE TONS PER YEAR PM_{30} (M)	PM_{10} (N)	$PM_{2.5}$ (O)
45-010	12	Silo, Filling - Pneumatic	NA	88,119	19		Baghouse with Single Pickup (Attach	99.5	0.270	0.016	0.005	0.06	0.00	0.00
45-013	4	Transfer Point (Note 2)	5	88,119	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
45-019	17	Feeder	2.7	88,119	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
45-020,21	0	No Device	325	0	0		None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
45-020	8	Crushing, Dry - Tertiary	250	88,119	18		Baghouse with Single Pickup (Full En	99.0	1.850	0.112	0.035	0.82	0.05	0.02
45-037	4	Transfer Point (Note 2)	NA	88,119	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
45-038	4	Transfer Point (Note 2)	0.5	88,119	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
45-039	5	Conveyor (Note 2)	10	88,119	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
45-053	5	Conveyor (Note 2)	3	87,418	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
45-041	4	Transfer Point (Note 2)	50	76,675	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
45-043	17	Feeder	1	88,119	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
45-045	17	Feeder	1.5	77,375	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
45-047	4	Transfer Point (Note 2)	150	10,743	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
45-048	17	Feeder	0.75	10,743	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
45-050	17	Feeder	1	10,743	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
		TOTAL HORSEPOWER	800.45											
		AVERAGE THROUGHPUT PER DEVICE		65,243										

BLOCK XIV - EMISSIONS & HARP INPUTS

EMISSION INVENTORY INPUTS

DEVICE DATA

PERMIT ID	B007674
NUMBER OF DEVICES	15
EQUIPMENT SIZE (bhp)	800.45

PROCESS DATA

PROCESS RATE (tpy)	88,119
MAX. DESIGN RATE (tph)	100
MAX. HOURLY PRODUCTION RATE (tph)	100
AVE. HOURLY PRODUCTION RATE (tph)	35

EMISSION DATA

ANNUAL EMISSIONS (tpy)	PM	PM_{10}	$PM_{2.5}$
UNCONTROLLED	94.350	6.086	1.903
CONTROLLED	0.884	0.057	0.018
EMISSION FACTOR (lb/ton)			
UNCONTROLLED	2.1414	0.1381	0.0432
CONTROLLED	0.0201	0.0013	0.0004
FRACTIONATION VALUE (PM10 or PM2.5 / PM)		0.0649	0.0203
OVERALL EFFICIENCY	99.06	99.06	99.06

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS AGGREGATE HANDLING, CRUSHING & SCREENING #1	FORM MINE AGG

I - COLOR CODE: DATA INPUT BY FACILITY | DATA FROM ANOTHER WORKSHEET | OUTPUT DATA TO CEIDARS

II - MANDATORY INFORMATION
- FLOW DIAGRAM
- BLOCK III - ALL ITEMS
- BLOCK VIII - ACTUAL HOURS OPERATED
- BLOCK IX - ANNUAL THROUGHPUT (tpy)
- BLOCK X - MOISTURE CONTENT (%) OF MATERIAL ENTERING THE SYSTEM
- BLOCK XIII, COLUMNS 'B', 'E', 'F' & 'G'

III - FACILITY INFORMATION

COMPANY NAME	Omya California Inc	COMPANY #	90	PERMIT #	B002003
FACILITY NAME	Plant	FACILITY #	461	DEVICE ID	2003
PROCESS NAME	Surface Treating Plant	INVENTORY ID #	9000461	PROCESS ID	

IV - MAP COORDINATES FOR PROCESS

UTM ZONE 11 UTM EAST (km) 505.316 UTM NORTH (km) 3804.415
LATITUDE (deg.) 34.387 LONGITUDE (deg.) 116.9422

V - TYPE OF PLANT

STATIONARY	x
PORTABLE	
OTHER	
COMMENTS	

VI - TYPE OF EQUIPMENT, check all that applies:

CRUSHERS		TRANSFER	x
SCREENS		STORAGE	x
CONVEYORS	x	LOAD OUT	
OTHERS			
COMMENTS			

VII - MATERIAL TYPES check all that applies

ROCK	
SAND	
LIMESTONE	x
LAVA ROCK	
OTHER	

VIII - OPERATING SCHEDULE

HOURS per DAY	10
DAYS per WEEK	5
WEEK per YEAR	52
CAL. HRS per YR	2600
ACT. HRS per YR	2500

CAL. Hrs/Yr = Hr/Dy*Dy/Wk*Wk/Yr

IX - THROUGHPUT (tons per year)

ACTUAL ANNUAL	7,881	Tons/Yr.
HOURLY (average)	3	TPH
MAX. DESIGN RATE	25.0	TPH

Hourly (average) = Annual (actual) / Actual Hours per Year (operated)

X - MOISTURE CONTENT (%)

MOISTURE CONTENT ENTERING SYS.: 3 %

XI - TYPE OF OPERATION AND / OR DEVICE

CODE	NAME OF DEVICE OR SYSTEM	CODE	NAME OF DEVICE OR SYSTEM
0	No Device	11	Screening, Wet Washing (Note 4)
1	Dump to Hopper, truck, pile (Note 2)	12	Silo, Filling - Pneumatic
2	Grizzly (Note 2)	13	Silo, Filling - Bucket Elevator
3	Hopper (Note 2)	14	Silo, discharge to Conveyor (Note 2)
4	Transfer Point (Note 2)	15	Silo, discharge to Tank Truck
5	Conveyor (Note 2)	16	Loading Open Top Truck (Note 2)
6	Crushing, Dry - Primary	17	Feeder
7	Crushing, Dry - Secondary	18	See Lookup Table "EmFac" for data
8	Crushing, Dry - Tertiary	19	See Lookup Table "EmFac" for data
9	Crushing, Wet (Note 3)	20	See Lookup Table "EmFac" for data
10	Screening, Dry	21	See Lookup Table "EmFac" for data

XII - TYPE OF EMISSION CONTROL EQUIPMENT

CODE	TYPE OF CONTROL	CODE	TYPE OF CONTROL
0	None	11	Gravel Bed Filters
1	Water Spray, Point of Application	12	Spray Tower (Low Efficiency)
2	Spray with Additives, Point of Application	13	Wet Scrubber (Med Efficiency)
3	Conveyor with Half Cover	14	Venturi Scrubber (High Efficiency)
4	Conveyor with Three Quarter Cover	15	Baghouse with Multiple Pickups
5	Conveyor with Full Cover	16	Baghouse with Single Pickup (Unenclosed)
6	Process Enclosure	17	Baghouse with Single Pickup (Partial Enclosed)
7	Gravity Separator	18	Baghouse with Single Pickup (Full Enclosed)
8	Cyclone - Simple	19	Baghouse with Single Pickup (Attached)
9	Cyclone - Multiple	20	Electrostatic Precipitator
10	Windscreen, Windward Side	21	See Lookup Table "ConEff" for data

XIII - EMISSION CALCULATIONS

EQUIPMENT ID NUMBER (A)	DEVICE CODE NO (B)	NAME OF DEVICE (C)	MOTOR BHP (D)	THROUGHPUT TONS / YEAR (E)	EMISSION CONTROL DEVICE CODE (F)	DsF (G)	NAME OF DEVICE (H)	EFF % (I)	EMISSION FACTORS POUNDS PER TON PM_{30} (J)	PM_{10} (K)	$PM_{2.5}$ (L)	EMISSION RATE TONS PER YEAR PM_{30} (M)	PM_{10} (N)	$PM_{2.5}$ (O)
49-001	12	Silo, Filling - Pneumatic	NA	7,881	19		Baghouse with Single Pickup (Attache	99.5	0.270	0.016	0.005	0.01	0.00	0.00
49-006	3	Hopper (Note 2)	NA	7,881	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
49-008	5	Conveyor (Note 2)	20	7,881	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
49-011	4	Transfer Point (Note 2)	100	7,881	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
49-024	4	Transfer Point (Note 2)	50	7,881	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
49-027	4	Transfer Point (Note 2)	NA	7,881	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
49-032	17	Feeder	1	7,881	18		Baghouse with Single Pickup (Full En	99.0	0.002	0.001	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		TOTAL HORSEPOWER	171											
		AVERAGE THROUGHPUT PER DEVICE		7,881										

BLOCK XIV - EMISSIONS & HARP INPUTS

EMISSION INVENTORY INPUTS

DEVICE DATA

PERMIT ID	B002003
NUMBER OF DEVICES	7
EQUIPMENT SIZE (bhp)	171

PROCESS DATA

PROCESS RATE (tpy)	7,881
MAX. DESIGN RATE (tph)	25
MAX. HOURLY PRODUCTION RATE (tph)	25
AVE. HOURLY PRODUCTION RATE (tph)	3

EMISSION DATA

	PM	PM_{10}	$PM_{2.5}$
ANNUAL EMISSIONS (tpy)			
UNCONTROLLED	1.120	0.089	0.028
CONTROLLED	0.006	0.001	0.000
EMISSION FACTOR (lb/ton)			
UNCONTROLLED	0.2841	0.0227	0.0071
CONTROLLED	0.0015	0.0001	0.0000
FRACTIONATION VALUE (PM10 or PM2.5 / PM)		0.0984	0.0308
OVERALL EFFICIENCY	99.48	99.35	99.35

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS AGGREGATE HANDLING, CRUSHING & SCREENING #1	FORM MINE AGG

I - COLOR CODE

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

II - MANDATORY INFORMATION

FLOW DIAGRAM
BLOCK III - ALL ITEMS
BLOCK VIII - ACTUAL HOURS OPERATED
BLOCK IX - ANNUAL THROUGHPUT (tpy)
BLOCK X - MOISTURE CONTENT (%) OF MATERIAL ENTERING THE SYSTEM
BLOCK XIII, COLUMNS 'B', 'E', 'F' & 'G'

III - FACILITY INFORMATION

COMPANY NAME	Omya California Inc	COMPANY #	90	PERMIT #	B 0 0 0 7 5 4
FACILITY NAME	Plant	FACILITY #	461	DEVICE ID	754
PROCESS NAME	Rock Storage System/Plan	INVENTORY ID #	9000461	PROCESS ID	

IV - MAP COORDINATES FOR PROCESS

UTM ZONE 11 UTM EAST (km) 5 0 5 . 3 1 6 UTM NORTH (km) 3 8 0 4 . 4 1 5
LATITUDE (deg.) 3 4 . 3 8 3 7 LONGITUDE (deg.) 1 1 6 . 9 4 2 2

V - TYPE OF PLANT

STATIONARY	x
PORTABLE	
OTHER	
COMMENTS	

VI - TYPE OF EQUIPMENT, check all that applies:

CRUSHERS		TRANSFER	x
SCREENS	x	STORAGE	x
CONVEYORS	x	LOAD OUT	x
OTHERS			
COMMENTS			

VII - MATERIAL TYPES check all that applies

ROCK	
SAND	
LIMESTONE	x
LAVA ROCK	
OTHER	

VIII - OPERATING SCHEDULE

HOURS per DAY	10
DAYS per WEEK	5
WEEK per YEAR	52
CAL. HRS per YR	2600
ACT. HRS per YR	2500

CAL. Hrs/Yr = Hr/Dy*Dy/Wk*Wk/Yr

IX - THROUGHPUT (tons per year)

ACTUAL ANNUAL	360,117	Tons/Yr.
HOURLY (average)	144	TPH
MAX. DESIGN RATE	300.0	TPH

Hourly (average) = Annual (actual) / Actual Hours per Year (operated)

X - MOISTURE CONTENT (%)

MOISTURE CONTENT ENTERING SYS.: 0 %

XI - TYPE OF OPERATION AND / OR DEVICE

CODE	NAME OF DEVICE OR SYSTEM	CODE	NAME OF DEVICE OR SYSTEM
0	No Device	11	Screening, Wet Washing (Note 4)
1	Dump to Hopper, truck, pile (Note 2)	12	Silo, Filling - Pneumatic
2	Grizzly (Note 2)	13	Silo, Filling - Bucket Elevator
3	Hopper (Note 2)	14	Silo, discharge to Conveyor (Note 2)
4	Transfer Point (Note 2)	15	Silo, discharge to Tank Truck
5	Conveyor (Note 2)	16	Loading Open Top Truck (Note 2)
6	Crushing, Dry - Primary	17	Feeder
7	Crushing, Dry - Secondary	18	See Lookup Table "EmFac" for data
8	Crushing, Dry - Tertiary	19	See Lookup Table "EmFac" for data
9	Crushing, Wet (Note 3)	20	See Lookup Table "EmFac" for data
10	Screening, Dry	21	See Lookup Table "EmFac" for data

XII - TYPE OF EMISSION CONTROL EQUIPMENT

CODE	TYPE OF CONTROL	CODE	TYPE OF CONTROL
0	None	11	Gravel Bed Filters
1	Water Spray, Point of Application	12	Spray Tower (Low Efficiency)
2	Spray with Additives, Point of Application	13	Wet Scrubber (Med Efficiency)
3	Conveyor with Half Cover	14	Venturi Scrubber (High Efficiency)
4	Conveyor with Three Quarter Cover	15	Baghouse with Multiple Pickups
5	Conveyor with Full Cover	16	Baghouse with Single Pickup (Unenclosed)
6	Process Enclosure	17	Baghouse with Single Pickup (Partial Enclosed)
7	Gravity Separator	18	Baghouse with Single Pickup (Full Enclosed)
8	Cyclone - Simple	19	Baghouse with Single Pickup (Attached)
9	Cyclone - Multiple	20	Electrostatic Precipitator
10	Windscreen, Windward Side	21	See Lookup Table "ConEff" for data

XIII - EMISSION CALCULATIONS

EQUIPMENT ID NUMBER (A)	DEVICE CODE NO (B)	NAME OF DEVICE (C)	MOTOR BHP (D)	THROUGHPUT TONS / YEAR (E)	EMISSION CONTROL DEVICE CODE (F)	DsF (G)	NAME OF DEVICE (H)	EFF % (I)	EMISSION FACTORS POUNDS PER TON PM_{30} (J)	PM_{10} (K)	$PM_{2.5}$ (L)	EMISSION RATE TONS PER YEAR PM_{30} (M)	PM_{10} (N)	$PM_{2.5}$ (O)
17	1	Dump to Hopper, truck, pile (Note 2)	NA	360,117	1		Water Spray, Point of Application	75.0	0.029	0.014	0.004	1.30	0.62	0.19
18	4	Transfer Point (Note 2)	NA	360,117	1		Water Spray, Point of Application	75.0	0.029	0.014	0.004	1.30	0.62	0.19
18.1	2	Grizzly (Note 2)	30	360,117	1		Water Spray, Point of Application	75.0	0.029	0.014	0.004	1.30	0.62	0.19
19	7	Crushing, Dry - Secondary	150	360,117	15		Baghouse with Multiple Pickups	95.0	0.560	0.034	0.010	5.04	0.31	0.09
20	4	Transfer Point (Note 2)	NA	360,117	15		Baghouse with Multiple Pickups	95.0	0.029	0.014	0.004	0.26	0.12	0.04
21	5	Conveyor (Note 2)	20	360,117	15		Baghouse with Multiple Pickups	95.0	0.029	0.014	0.004	0.26	0.12	0.04
22	5	Conveyor (Note 2)	43	360,117	1		Water Spray, Point of Application	75.0	0.029	0.014	0.004	1.30	0.62	0.19
		TOTAL HORSEPOWER	243											
		AVERAGE THROUGHPUT PER DEVICE		360,117										

BLOCK XIV - EMISSIONS & HARP INPUTS

EMISSION INVENTORY INPUTS

DEVICE DATA

PERMIT ID	B000754
NUMBER OF DEVICES	7
EQUIPMENT SIZE (bhp)	243

PROCESS DATA

PROCESS RATE (tpy)	360,117
MAX. DESIGN RATE (tph)	300
MAX. HOURLY PRODUCTION RATE (tph)	300
AVE. HOURLY PRODUCTION RATE (tph)	144

EMISSION DATA

ANNUAL EMISSIONS (tpy)	PM	PM_{10}	$PM_{2.5}$
UNCONTROLLED	132.065	20.894	6.443
CONTROLLED	10.768	3.014	0.941
EMISSION FACTOR (lb/ton)			
UNCONTROLLED	0.7335	0.1160	0.0358
CONTROLLED	0.0598	0.0167	0.0052
FRACTIONATION VALUE (PM10 or PM2.5 / PM)		0.2799	0.0874
OVERALL EFFICIENCY	91.85	85.57	85.39

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS AGGREGATE HANDLING, CRUSHING & SCREENING #1	FORM MINE AGG

I - COLOR CODE: DATA INPUT BY FACILITY | DATA FROM ANOTHER WORKSHEET | OUTPUT DATA TO CEIDARS

II - MANDATORY INFORMATION
FLOW DIAGRAM
BLOCK III - ALL ITEMS
BLOCK VIII - ACTUAL HOURS OPERATED
BLOCK IX - ANNUAL THROUGHPUT (tpy)
BLOCK X - MOISTURE CONTENT (%) OF MATERIAL ENTERING THE SYSTEM
BLOCK XIII, COLUMNS 'B', 'E', 'F' & 'G'

III - FACILITY INFORMATION

COMPANY NAME	Omya California Inc	COMPANY #	90	PERMIT #	B 0 0 0 7 6 3
FACILITY NAME	Plant	FACILITY #	461	DEVICE ID	763
PROCESS NAME	Optical Sorter	INVENTORY ID #	9000461	PROCESS ID	

IV - MAP COORDINATES FOR PROCESS
UTM ZONE 11 UTM EAST (km) 5 0 5 . 3 1 6 UTM NORTH (km) 3 8 0 4 . 4 1 5
LATITUDE (deg.) 3 4 . 3 8 3 7 LONGITUDE (deg.) 1 1 6 . 9 4 2 2

V - TYPE OF PLANT
STATIONARY x
PORTABLE
OTHER
COMMENTS

VI - TYPE OF EQUIPMENT, check all that applies:
CRUSHERS x TRANSFER x
SCREENS STORAGE x
CONVEYORS x LOAD OUT
OTHERS
COMMENTS

VII - MATERIAL TYPES check all that applies
ROCK
SAND
LIMESTONE x
LAVA ROCK
OTHER

VIII - OPERATING SCHEDULE
HOURS per DAY 10
DAYS per WEEK 5
WEEK per YEAR 52
CAL. HRS per YR 2600
ACT. HRS per YR 2500
CAL. Hrs/Yr = Hr/Dy*Dy/Wk*Wk/Yr

IX - THROUGHPUT (tons per year)
ACTUAL ANNUAL 2,300 Tons/Yr.
HOURLY (average) 1 TPH
MAX. DESIGN RATE TPH
Hourly (average) = Annual (actual) / Actual Hours per Year (operated)

X - MOISTURE CONTENT (%)
MOISTURE CONTENT ENTERING SYS.: 3 %

XI - TYPE OF OPERATION AND / OR DEVICE

CODE	NAME OF DEVICE OR SYSTEM	CODE	NAME OF DEVICE OR SYSTEM
0	No Device	11	Screening, Wet Washing (Note 4)
1	Dump to Hopper, truck, pile (Note 2)	12	Silo, Filling - Pneumatic
2	Grizzly (Note 2)	13	Silo, Filling - Bucket Elevator
3	Hopper (Note 2)	14	Silo, discharge to Conveyor (Note 2)
4	Transfer Point (Note 2)	15	Silo, discharge to Tank Truck
5	Conveyor (Note 2)	16	Loading Open Top Truck (Note 2)
6	Crushing, Dry - Primary	17	Feeder
7	Crushing, Dry - Secondary	18	See Lookup Table "EmFac" for data
8	Crushing, Dry - Tertiary	19	See Lookup Table "EmFac" for data
9	Crushing, Wet (Note 3)	20	See Lookup Table "EmFac" for data
10	Screening, Dry	21	See Lookup Table "EmFac" for data

XII - TYPE OF EMISSION CONTROL EQUIPMENT

CODE	TYPE OF CONTROL	CODE	TYPE OF CONTROL
0	None	11	Gravel Bed Filters
1	Water Spray, Point of Application	12	Spray Tower (Low Efficiency)
2	Spray with Additives, Point of Application	13	Wet Scrubber (Med Efficiency)
3	Conveyor with Half Cover	14	Venturi Scrubber (High Efficiency)
4	Conveyor with Three Quarter Cover	15	Baghouse with Multiple Pickups
5	Conveyor with Full Cover	16	Baghouse with Single Pickup (Unenclosed)
6	Process Enclosure	17	Baghouse with Single Pickup (Partial Enclosed)
7	Gravity Separator	18	Baghouse with Single Pickup (Full Enclosed)
8	Cyclone - Simple	19	Baghouse with Single Pickup (Attached)
9	Cyclone - Multiple	20	Electrostatic Precipitator
10	Windscreen, Windward Side	21	See Lookup Table "ConEff" for data

XIII - EMISSION CALCULATIONS

EQUIPMENT ID NUMBER (A)	DEVICE CODE NO (B)	NAME OF DEVICE (C)	MOTOR BHP (D)	THROUGHPUT TONS / YEAR (E)	EMISSION CONTROL DEVICE CODE (F)	DsF (G)	NAME OF DEVICE (H)	EFF % (I)	EMISSION FACTORS POUNDS PER TON PM_{30} (J)	PM_{10} (K)	$PM_{2.5}$ (L)	EMISSION RATE TONS PER YEAR PM_{30} (M)	PM_{10} (N)	$PM_{2.5}$ (O)
36-001	17	Feeder	13	2,300	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
36-002	5	Conveyor (Note 2)	15	2,300	15		Baghouse with Multiple Pickups	95.0	0.002	0.001	0.000	0.00	0.00	0.00
36-003	10	Screening, Dry	15	2,300	15		Baghouse with Multiple Pickups	95.0	0.160	0.120	0.038	0.01	0.01	0.00
36-004	11	Screening, Wet Washing (Note 4)	25	899	0		None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
36-005	17	Feeder	5	899	13		Wet Scrubber (Med Efficiency)	95.0	0.002	0.001	0.000	0.00	0.00	0.00
36-006	4	Transfer Point (Note 2)	N/A	899	13		Wet Scrubber (Med Efficiency)	95.0	0.002	0.001	0.000	0.00	0.00	0.00
36-008	5	Conveyor (Note 2)	10	1,400	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.00	0.00	0.00
36-007	5	Conveyor (Note 2)	10	1,400	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.00	0.00	0.00
		TOTAL HORSEPOWER	93											
		AVERAGE THROUGHPUT PER DEVICE		1,550										

BLOCK XIV - EMISSIONS & HARP INPUTS

EMISSION INVENTORY INPUTS

DEVICE DATA

PERMIT ID	B000763
NUMBER OF DEVICES	8
EQUIPMENT SIZE (bhp)	93

PROCESS DATA

PROCESS RATE (tpy)	2,300
MAX. DESIGN RATE (tph)	0
MAX. HOURLY PRODUCTION RATE (tph)	0
AVE. HOURLY PRODUCTION RATE (tph)	1

EMISSION DATA

ANNUAL EMISSIONS (tpy)	PM	PM_{10}	$PM_{2.5}$
UNCONTROLLED	0.195	0.143	0.045
CONTROLLED	0.010	0.007	0.002
EMISSION FACTOR (lb/ton)			
UNCONTROLLED	0.1694	0.1245	0.0394
CONTROLLED	0.0090	0.0065	0.0021
FRACTIONATION VALUE (PM10 or PM2.5 / PM)		0.7180	0.2272
OVERALL EFFICIENCY	94.66	94.78	94.78

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS AGGREGATE HANDLING, CRUSHING & SCREENING #1	FORM MINE AGG

I - COLOR CODE

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

II - MANDATORY INFORMATION

FLOW DIAGRAM
BLOCK III - ALL ITEMS
BLOCK VIII - ACTUAL HOURS OPERATED
BLOCK IX - ANNUAL THROUGHPUT (tpy)
BLOCK X - MOISTURE CONTENT (%) OF MATERIAL ENTERING THE SYSTEM
BLOCK XIII, COLUMNS 'B', 'E', 'F' & 'G'

III - FACILITY INFORMATION

COMPANY NAME	Omya California Inc	COMPANY #	90	PERMIT #	B 0 0 2 0 0 9
FACILITY NAME	Plant	FACILITY #	461	DEVICE ID	2009
PROCESS NAME	Coarse Product Storage System	INVENTORY ID #	9000461	PROCESS ID	

IV - MAP COORDINATES FOR PROCESS

UTM ZONE 11 UTM EAST (km) 5 0 5 . 3 1 6 UTM NORTH (km) 3 8 0 4 . 4 1 5
LATITUDE (deg.) 3 4 . 3 8 3 7 LONGITUDE (deg.) 1 1 6 . 9 4 2 2

V - TYPE OF PLANT

STATIONARY	x
PORTABLE	
OTHER	
COMMENTS	

VI - TYPE OF EQUIPMENT, check all that applies:

CRUSHERS		TRANSFER	x
SCREENS		STORAGE	x
CONVEYORS	x	LOAD OUT	x
OTHERS			
COMMENTS			

VII - MATERIAL TYPES (check all that applies)

ROCK	
SAND	
LIMESTONE	x
LAVA ROCK	
OTHER	

VIII - OPERATING SCHEDULE

HOURS per DAY	10
DAYS per WEEK	5
WEEK per YEAR	52
CAL. HRS per YR	2600
ACT. HRS per YR	2500

CAL. Hrs/Yr = Hr/Dy*Dy/Wk*Wk/Yr

IX - THROUGHPUT (tons per year)

ACTUAL ANNUAL	Varies	Tons/Yr.
HOURLY (average)	Refer to Block VIII	TPH
MAX. DESIGN RATE	50.0	TPH

Hourly (average) = Annual (actual) / Actual Hours per Year (operated)

X - MOISTURE CONTENT (%)

MOISTURE CONTENT ENTERING SYS.: 0 %

XI - TYPE OF OPERATION AND / OR DEVICE

CODE	NAME OF DEVICE OR SYSTEM	CODE	NAME OF DEVICE OR SYSTEM
0	No Device	11	Screening, Wet Washing (Note 4)
1	Dump to Hopper, truck, pile (Note 2)	12	Silo, Filling - Pneumatic
2	Grizzly (Note 2)	13	Silo, Filling - Bucket Elevator
3	Hopper (Note 2)	14	Silo, discharge to Conveyor (Note 2)
4	Transfer Point (Note 2)	15	Silo, discharge to Tank Truck
5	Conveyor (Note 2)	16	Loading Open Top Truck (Note 2)
6	Crushing, Dry - Primary	17	Feeder
7	Crushing, Dry - Secondary	18	See Lookup Table "EmFac" for data
8	Crushing, Dry - Tertiary	19	See Lookup Table "EmFac" for data
9	Crushing, Wet (Note 3)	20	See Lookup Table "EmFac" for data
10	Screening, Dry	21	See Lookup Table "EmFac" for data

XII - TYPE OF EMISSION CONTROL EQUIPMENT

CODE	TYPE OF CONTROL	CODE	TYPE OF CONTROL
0	None	11	Gravel Bed Filters
1	Water Spray, Point of Application	12	Spray Tower (Low Efficiency)
2	Spray with Additives, Point of Application	13	Wet Scrubber (Med Efficiency)
3	Conveyor with Half Cover	14	Venturi Scrubber (High Efficiency)
4	Conveyor with Three Quarter Cover	15	Baghouse with Multiple Pickups
5	Conveyor with Full Cover	16	Baghouse with Single Pickup (Unenclosed)
6	Process Enclosure	17	Baghouse with Single Pickup (Partial Enclosed)
7	Gravity Separator	18	Baghouse with Single Pickup (Full Enclosed)
8	Cyclone - Simple	19	Baghouse with Single Pickup (Attached)
9	Cyclone - Multiple	20	Electrostatic Precipitator
10	Windscreen, Windward Side	21	See Lookup Table "ConEff" for data

XIII - EMISSION CALCULATIONS

EQUIPMENT ID NUMBER (A)	DEVICE CODE NO (B)	NAME OF DEVICE (C)	MOTOR BHP (D)	THROUGHPUT TONS / YEAR (E)	EMISSION CONTROL DEVICE CODE (F)	DsF (G)	NAME OF DEVICE (H)	EFF % (I)	EMISSION FACTORS POUNDS PER TON PM_{30} (J)	PM_{10} (K)	$PM_{2.5}$ (L)	EMISSION RATE TONS PER YEAR PM_{30} (M)	PM_{10} (N)	$PM_{2.5}$ (O)
81-010	12	Silo, Filling - Pneumatic	NA	26,663	19		Baghouse with Single Pickup (Attached	99.5	0.270	0.016	0.005	0.02	0.00	0.00
81-112	4	Transfer Point (Note 2)	NA	26,663	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.00	0.00	0.00
81-112	5	Conveyor (Note 2)	40	26,663	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.00	0.00	0.00
81-115	4	Transfer Point (Note 2)	6	0	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.00	0.00	0.00
81-020	12	Silo, Filling - Pneumatic	NA	7,456	19		Baghouse with Single Pickup (Attached	99.5	0.270	0.016	0.005	0.01	0.00	0.00
81-024	4	Transfer Point (Note 2)	NA	7,456	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.00	0.00	0.00
81-024	5	Conveyor (Note 2)	40	7,456	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.00	0.00	0.00
81-022	4	Transfer Point (Note 2)	1	9,353	15		Baghouse with Multiple Pickups	95.0	0.029	0.014	0.004	0.01	0.00	0.00
81-030	12	Silo, Filling - Pneumatic	NA	23,861	19		Baghouse with Single Pickup (Attached	99.5	0.270	0.016	0.005	0.02	0.00	0.00
81-032	17	Feeder	2	23,861	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.00	0.00	0.00
81-002	17	Feeder	2	47,722	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.01	0.00	0.00
81-034	4	Transfer Point (Note 2)	1	47,722	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.01	0.00	0.00
81-040	12	Silo, Filling - Pneumatic	NA	23,861	18		Baghouse with Single Pickup (Full Enc	99.0	0.270	0.016	0.005	0.03	0.00	0.00
81-043	17	Feeder	0.75	23,861	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.00	0.00	0.00
81-460	12	Silo, Filling - Pneumatic	NA	0	19		Baghouse with Single Pickup (Attached	99.5	0.270	0.016	0.005	0.00	0.00	0.00
81-462	4	Transfer Point (Note 2)	NA	0	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.00	0.00	0.00
81-462	5	Conveyor (Note 2)	20	0	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.00	0.00	0.00
81-500	12	Silo, Filling - Pneumatic	NA	47,722	19		Baghouse with Single Pickup (Attached	99.5	0.270	0.016	0.005	0.03	0.00	0.00
81-507	17	Feeder	3	47,722	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.01	0.00	0.00
81-508	4	Transfer Point (Note 2)	NA	47,722	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.01	0.00	0.00
81-522	5	Conveyor (Note 2)	30	23,861	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.00	0.00	0.00
81-512	5	Conveyor (Note 2)	30	23,861	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.00	0.00	0.00
81525	15	Silo, discharge to Tank Truck	1	23,861	18		Baghouse with Single Pickup (Full Enc	99.0	0.240	0.016	0.005	0.03	0.00	0.00
81-515	15	Silo, discharge to Tank Truck	1	23,861	18		Baghouse with Single Pickup (Full Enc	99.0	0.240	0.016	0.005	0.03	0.00	0.00
81-600	12	Silo, Filling - Pneumatic	NA	16,962	19		Baghouse with Single Pickup (Attached	99.5	0.270	0.016	0.005	0.01	0.00	0.00
81-607	17	Feeder	3	16,962	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.00	0.00	0.00
81-608	4	Transfer Point (Note 2)	NA	16,962	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.00	0.00	0.00
81-622	5	Conveyor (Note 2)	30	11,825	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.00	0.00	0.00
81-612	5	Conveyor (Note 2)	30	11,825	18		Baghouse with Single Pickup (Full Enc	99.0	0.029	0.014	0.004	0.00	0.00	0.00
81-625	15	Silo, discharge to Tank Truck	1	11,825	18		Baghouse with Single Pickup (Full Enc	99.0	0.240	0.016	0.005	0.01	0.00	0.00
81-615	15	Silo, discharge to Tank Truck	1	11,825	18		Baghouse with Single Pickup (Full Enc	99.0	0.240	0.016	0.005	0.01	0.00	0.00
		TOTAL HORSEPOWER	242.75											
		AVERAGE THROUGHPUT PER DEVICE		20,626										

BLOCK XIV - EMISSIONS & HARP INPUTS

EMISSION INVENTORY INPUTS

DEVICE DATA

PERMIT ID	B002009
NUMBER OF DEVICES	31
EQUIPMENT SIZE (bhp)	242.75

PROCESS DATA

PROCESS RATE (tpy)	Varies
MAX. DESIGN RATE (tph)	50
MAX. HOURLY PRODUCTION RATE (tph)	50
AVE. HOURLY PRODUCTION RATE (tph)	Need Actual Hours in 'CD21'

EMISSION DATA

ANNUAL EMISSIONS (tpy)	PM	PM_{10}	$PM_{2.5}$
UNCONTROLLED	34.438	4.625	1.450
CONTROLLED	0.267	0.044	0.014
EMISSION FACTOR (lb/ton)			
UNCONTROLLED	#VALUE!	#VALUE!	#VALUE!
CONTROLLED	#VALUE!	#VALUE!	#VALUE!
FRACTIONATION VALUE (PM10 or PM2.5 / PM)		0.1644	0.0516
OVERALL EFFICIENCY	#VALUE!	#VALUE!	#VALUE!

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS AGGREGATE HANDLING, CRUSHING & SCREENING #2	FORM MINE AGG

I - COLOR CODE

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

II - MANDATORY INFORMATION

FLOW DIAGRAM
BLOCK III - ALL ITEMS
BLOCK VIII - ACTUAL HOURS OPERATED
BLOCK IX - ANNUAL THROUGHPUT (tpy)
BLOCK X - MOISTURE CONTENT (%) OF MATERIAL ENTERING THE SYSTEM
BLOCK XIII, COLUMNS 'B', 'E', 'F' & 'G'

III - FACILITY INFORMATION

COMPANY NAME	Omya California Inc	COMPANY #	90	PERMIT #	T 0 0 4 9 6 7
FACILITY NAME	Plant	FACILITY #	461	DEVICE ID	4967
PROCESS NAME	Silo 81-70c	INVENTORY ID #	9000461	PROCESS ID	

IV - MAP COORDINATES FOR PROCESS

UTM ZONE 11 UTM EAST (km) . UTM NORTH (km) .
LATITUDE (deg.) . LONGITUDE (deg.) .

V - TYPE OF PLANT		VI - TYPE OF EQUIPMENT, check all that applies:				VII - MATERIAL TYPES check all that applies		VIII - OPERATING SCHEDULE	
STATIONARY	x	CRUSHERS		TRANSFER	x	ROCK		HOURS per DAY	10
PORTABLE		SCREENS		STORAGE	x	SAND		DAYS per WEEK	5
OTHER		CONVEYORS	x	LOAD OUT	x	LIMESTONE	x	WEEK per YEAR	52
COMMENTS		OTHERS				LAVA ROCK		CAL. HRS per YR	2600
		COMMENTS				OTHER		ACT. HRS per YR	2500
								CAL. Hrs/Yr = Hr/Dy*Dy/Wk*Wk/Yr	

IX - THROUGHPUT (tons per year)

ACTUAL ANNUAL	138,527	Tons/Yr.
HOURLY (average)	55	TPH
MAX. DESIGN RATE	100.0	TPH

Hourly (average) = Annual (actual) / Actual Hours per Year (operated)

X - MOISTURE CONTENT (%)

MOISTURE CONTENT ENTERING SYS.: 0 %

XI - TYPE OF OPERATION AND / OR DEVICE

CODE	NAME OF DEVICE OR SYSTEM	CODE	NAME OF DEVICE OR SYSTEM
0	No Device	11	Screening, Wet Washing (Note 4)
1	Dump to Hopper, truck, pile (Note 2)	12	Silo, Filling - Pneumatic
2	Grizzly (Note 2)	13	Silo, Filling - Bucket Elevator
3	Hopper (Note 2)	14	Silo, discharge to Conveyor (Note 2)
4	Transfer Point (Note 2)	15	Silo, discharge to Tank Truck
5	Conveyor (Note 2)	16	Loading Open Top Truck (Note 2)
6	Crushing, Dry - Primary	17	Feeder
7	Crushing, Dry - Secondary	18	See Lookup Table "EmFac" for data
8	Crushing, Dry - Tertiary	19	See Lookup Table "EmFac" for data
9	Crushing, Wet (Note 3)	20	See Lookup Table "EmFac" for data
10	Screening, Dry	21	See Lookup Table "EmFac" for data

XII - TYPE OF EMISSION CONTROL EQUIPMENT

CODE	TYPE OF CONTROL	CODE	TYPE OF CONTROL
0	None	11	Gravel Bed Filters
1	Water Spray, Point of Application	12	Spray Tower (Low Efficiency)
2	Spray with Additives, Point of Application	13	Wet Scrubber (Med Efficiency)
3	Conveyor with Half Cover	14	Venturi Scrubber (High Efficiency)
4	Conveyor with Three Quarter Cover	15	Baghouse with Multiple Pickups
5	Conveyor with Full Cover	16	Baghouse with Single Pickup (Unenclosed)
6	Process Enclosure	17	Baghouse with Single Pickup (Partial Enclosed)
7	Gravity Separator	18	Baghouse with Single Pickup (Full Enclosed)
8	Cyclone - Simple	19	Baghouse with Single Pickup (Attached)
9	Cyclone - Multiple	20	Electrostatic Precipitator
10	Windscreen, Windward Side	21	See Lookup Table "ConEff" for data

XIII - EMISSION CALCULATIONS

EQUIPMENT ID NUMBER (A)	DEVICE CODE NO (B)	NAME OF DEVICE (C)	MOTOR BHP (D)	THROUGHPUT TONS / YEAR (E)	EMISSION CONTROL DEVICE CODE (F)	DsF (G)	NAME OF DEVICE (H)	EFF % (I)	EMISSION FACTORS POUNDS PER TON PM_{30} (J)	PM_{10} (K)	$PM_{2.5}$ (L)	EMISSION RATE TONS PER YEAR PM_{30} (M)	PM_{10} (N)	$PM_{2.5}$ (O)
81-700	12	Silo, Filling - Pneumatic	NA	138,527	19		Baghouse with Single Pickup (Attach	99.5	0.270	0.016	0.005	0.09	0.01	0.00
81-707	4	Transfer Point (Note 2)	NA	138,527	18		Baghouse with Single Pickup (Full E	99.0	0.029	0.014	0.004	0.02	0.01	0.00
81-708	4	Transfer Point (Note 2)	NA	138,527	18		Baghouse with Single Pickup (Full E	99.0	0.029	0.014	0.004	0.02	0.01	0.00
81-722	5	Conveyor (Note 2)	30	69,263	18		Baghouse with Single Pickup (Full E	99.0	0.029	0.014	0.004	0.01	0.00	0.00
81-712	5	Conveyor (Note 2)	30	69,263	18		Baghouse with Single Pickup (Full E	99.0	0.029	0.014	0.004	0.01	0.00	0.00
81-725	15	Silo, discharge to Tank Truck	1	69,263	18		Baghouse with Single Pickup (Full E	99.0	0.240	0.016	0.005	0.08	0.01	0.00
81-715	15	Silo, discharge to Tank Truck	1	69,263	18		Baghouse with Single Pickup (Full E	99.0	0.240	0.016	0.005	0.08	0.01	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00

TOTAL HORSEPOWER	62
AVERAGE THROUGHPUT PER DEVICE	98,948

BLOCK XIV - EMISSIONS & HARP INPUTS

EMISSION INVENTORY INPUTS

DEVICE DATA

PERMIT ID	T004967
NUMBER OF DEVICES	7
EQUIPMENT SIZE (bhp)	62

PROCESS DATA

PROCESS RATE (tpy)	138,527
MAX. DESIGN RATE (tph)	100
MAX. HOURLY PRODUCTION RATE (tph)	100
AVE. HOURLY PRODUCTION RATE (tph)	55

EMISSION DATA

ANNUAL EMISSIONS (tpy)	PM	PM_{10}	$PM_{2.5}$
UNCONTROLLED	41.331	5.058	1.586
CONTROLLED	0.320	0.045	0.014
EMISSION FACTOR (lb/ton)			
UNCONTROLLED	0.5967	0.0730	0.0229
CONTROLLED	0.0046	0.0007	0.0002
FRACTIONATION VALUE (PM10 or PM2.5 / PM)		0.1408	0.0442
OVERALL EFFICIENCY	99.23	99.11	99.11

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS AGGREGATE HANDLING, CRUSHING & SCREENING #1	FORM MINE AGG

I - COLOR CODE

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

II - MANDATORY INFORMATION

FLOW DIAGRAM
BLOCK III - ALL ITEMS
BLOCK VIII - ACTUAL HOURS OPERATED
BLOCK IX - ANNUAL THROUGHPUT (tpy)
BLOCK X - MOISTURE CONTENT (%) OF MATERIAL ENTERING THE SYSTEM
BLOCK XIII, COLUMNS 'B', 'E', 'F' & 'G'

III - FACILITY INFORMATION

COMPANY NAME	Omya California Inc	COMPANY #	90	PERMIT #	T 0 0 2 0 0 7
FACILITY NAME	Plant	FACILITY #	461	DEVICE ID	2007
PROCESS NAME	Bulk Loadout 82 System	INVENTORY ID #	9000461	PROCESS ID	

IV - MAP COORDINATES FOR PROCESS

UTM ZONE 11 UTM EAST (km) 5 0 5 . 3 1 6 UTM NORTH (km) 3 8 0 4 . 4 1 5
LATITUDE (deg.) 3 4 . 3 8 3 7 LONGITUDE (deg.) 1 1 6 . 9 4 2 2

V - TYPE OF PLANT

STATIONARY	x
PORTABLE	
OTHER	
COMMENTS	

VI - TYPE OF EQUIPMENT, check all that applies:

CRUSHERS		TRANSFER	x
SCREENS		STORAGE	x
CONVEYORS	x	LOAD OUT	x
OTHERS			
COMMENTS			

VII - MATERIAL TYPES check all that applies

ROCK	
SAND	
LIMESTONE	x
LAVA ROCK	
OTHER	

VIII - OPERATING SCHEDULE

HOURS per DAY	10
DAYS per WEEK	5
WEEK per YEAR	52
CAL. HRS per YR	2600
ACT. HRS per YR	2500

CAL. Hrs/Yr = Hr/Dy*Dy/Wk*Wk/Yr

IX - THROUGHPUT (tons per year)

ACTUAL ANNUAL	Varies	Tons/Yr.
HOURLY (average)	See Block VIII	TPH
MAX. DESIGN RATE	50.0	TPH

Hourly (average) = Annual (actual) / Actual Hours per Year (operated)

X - MOISTURE CONTENT (%)

MOISTURE CONTENT ENTERING SYS.: 0 %

XI - TYPE OF OPERATION AND / OR DEVICE

CODE	NAME OF DEVICE OR SYSTEM	CODE	NAME OF DEVICE OR SYSTEM
0	No Device	11	Screening, Wet Washing (Note 4)
1	Dump to Hopper, truck, pile (Note 2)	12	Silo, Filling - Pneumatic
2	Grizzly (Note 2)	13	Silo, Filling - Bucket Elevator
3	Hopper (Note 2)	14	Silo, discharge to Conveyor (Note 2)
4	Transfer Point (Note 2)	15	Silo, discharge to Tank Truck
5	Conveyor (Note 2)	16	Loading Open Top Truck (Note 2)
6	Crushing, Dry - Primary	17	Feeder
7	Crushing, Dry - Secondary	18	See Lookup Table "EmFac" for data
8	Crushing, Dry - Tertiary	19	See Lookup Table "EmFac" for data
9	Crushing, Wet (Note 3)	20	See Lookup Table "EmFac" for data
10	Screening, Dry	21	See Lookup Table "EmFac" for data

XII - TYPE OF EMISSION CONTROL EQUIPMENT

CODE	TYPE OF CONTROL	CODE	TYPE OF CONTROL
0	None	11	Gravel Bed Filters
1	Water Spray, Point of Application	12	Spray Tower (Low Efficiency)
2	Spray with Additives, Point of Application	13	Wet Scrubber (Med Efficiency)
3	Conveyor with Half Cover	14	Venturi Scrubber (High Efficiency)
4	Conveyor with Three Quarter Cover	15	Baghouse with Multiple Pickups
5	Conveyor with Full Cover	16	Baghouse with Single Pickup (Unenclosed)
6	Process Enclosure	17	Baghouse with Single Pickup (Partial Enclosed)
7	Gravity Separator	18	Baghouse with Single Pickup (Full Enclosed)
8	Cyclone - Simple	19	Baghouse with Single Pickup (Attached)
9	Cyclone - Multiple	20	Electrostatic Precipitator
10	Windscreen, Windward Side	21	See Lookup Table "ConEff" for data

XIII - EMISSION CALCULATIONS

EQUIPMENT ID NUMBER (A)	DEVICE CODE NO (B)	NAME OF DEVICE (C)	MOTOR BHP (D)	THROUGHPUT TONS / YEAR (E)	EMISSION CONTROL DEVICE CODE (F)	DsF (G)	NAME OF DEVICE (H)	EFF % (I)	EMISSION FACTORS POUNDS PER TON PM_{30} (J)	PM_{10} (K)	$PM_{2.5}$ (L)	EMISSION RATE TONS PER YEAR PM_{30} (M)	PM_{10} (N)	$PM_{2.5}$ (O)
82-070	12	Silo, Filling - Pneumatic	NA	7,935	19		Baghouse with Single Pickup (Attache	99.5	0.270	0.016	0.005	0.01	0.00	0.00
82-074	17	Feeder	1.5	1,578	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-075	4	Transfer Point (Note 2)	NA	6,357	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-057	4	Transfer Point (Note 2)	15	6,357	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-060	12	Silo, Filling - Pneumatic	NA	30,954	19		Baghouse with Single Pickup (Attache	99.5	0.270	0.016	0.005	0.02	0.00	0.00
82-056	4	Transfer Point (Note 2)	NA	30,954	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-056	4	Transfer Point (Note 2)	30	921	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-020	12	Silo, Filling - Pneumatic	NA	5,800	19		Baghouse with Single Pickup (Attache	99.5	0.270	0.016	0.005	0.00	0.00	0.00
82-028	4	Transfer Point (Note 2)	NA	0	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-025	4	Transfer Point (Note 2)	NA	5,800	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-025	17	Feeder	7.5	5,800	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-026	4	Transfer Point (Note 2)	NA	5,800	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-050	12	Silo, Filling - Pneumatic	NA	5,306	19		Baghouse with Single Pickup (Attache	99.5	0.270	0.016	0.005	0.00	0.00	0.00
82-219	4	Transfer Point (Note 2)	NA	4,312	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-220	5	Conveyor (Note 2)	50	11,825	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-220	4	Transfer Point (Note 2)	1	8,850	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-040	12	Silo, Filling - Pneumatic	NA	18,124	19		Baghouse with Single Pickup (Attache	99.5	0.270	0.016	0.005	0.01	0.00	0.00
82-209	4	Transfer Point (Note 2)	NA	11,825	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-210	5	Conveyor (Note 2)	25	11,825	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-092	4	Transfer Point (Note 2)	NA	6,385	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-092	5	Conveyor (Note 2)	7.5	6,385	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-091	4	Transfer Point (Note 2)	NA	6,385	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-090	12	Silo, Filling - Pneumatic	NA	6,385	19		Baghouse with Single Pickup (Attache	99.5	0.270	0.016	0.005	0.00	0.00	0.00
82-030	4	Transfer Point (Note 2)	NA	4,984	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-036	4	Transfer Point (Note 2)	15	4,984	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-033	4	Transfer Point (Note 2)	0	4,984	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-221	15	Silo, discharge to Tank Truck	0	13,132	18		Baghouse with Single Pickup (Full En	99.0	0.240	0.016	0.005	0.02	0.00	0.00

TOTAL HORSEPOWER	152.5
AVERAGE THROUGHPUT PER DEVICE	8,665

BLOCK XIV - EMISSIONS & HARP INPUTS

EMISSION INVENTORY INPUTS

DEVICE DATA

PERMIT ID	T002007
NUMBER OF DEVICES	27
EQUIPMENT SIZE (bhp)	152.5

PROCESS DATA

PROCESS RATE (tpy)	Varies
MAX. DESIGN RATE (tph)	50
MAX. HOURLY PRODUCTION RATE (tph)	50
AVE. HOURLY PRODUCTION RATE (tph)	Need Actual Hours in 'CD21'

EMISSION DATA

ANNUAL EMISSIONS (tpy)	PM	PM_{10}	$PM_{2.5}$
UNCONTROLLED	13.749	1.701	0.533
CONTROLLED	0.087	0.014	0.004
EMISSION FACTOR (lb/ton)			
UNCONTROLLED	#VALUE!	#VALUE!	#VALUE!
CONTROLLED	#VALUE!	#VALUE!	#VALUE!
FRACTIONATION VALUE (PM10 or PM2.5 / PM)		0.1609	0.0505
OVERALL EFFICIENCY	#VALUE!	#VALUE!	#VALUE!

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS AGGREGATE HANDLING, CRUSHING & SCREENING #1	FORM MINE AGG

I - COLOR CODE

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

III - FACILITY INFORMATION

COMPANY NAME	Omya California Inc	COMPANY #	90	PERMIT #	T 0 0 2 0 0 9
FACILITY NAME	Plant	FACILITY #	461	DEVICE ID	2009
PROCESS NAME	Bulk Loadout 83 System	INVENTORY ID #	9000461	PROCESS ID	

IV - MAP COORDINATES FOR PROCESS

UTM ZONE 11 UTM EAST (km) 5 0 5 . 3 1 6 UTM NORTH (km) 3 8 0 4 . 4 1 5

LATITUDE (deg.) 3 4 . 3 8 3 7 LONGITUDE (deg.) 1 1 6 . 9 4 2 2

II - MANDATORY INFORMATION

FLOW DIAGRAM
BLOCK III - ALL ITEMS
BLOCK VIII - ACTUAL HOURS OPERATED
BLOCK IX - ANNUAL THROUGHPUT (tpy)
BLOCK X - MOISTURE CONTENT (%) OF MATERIAL ENTERING THE SYSTEM
BLOCK XIII, COLUMNS 'B', 'E', 'F' & 'G'

V - TYPE OF PLANT

STATIONARY	x
PORTABLE	
OTHER	
COMMENTS	

VI - TYPE OF EQUIPMENT, check all that applies:

CRUSHERS		TRANSFER	x
SCREENS		STORAGE	x
CONVEYORS	x	LOAD OUT	x
OTHERS			
COMMENTS			

VII - MATERIAL TYPES check all that applies

ROCK	
SAND	
LIMESTONE	x
LAVA ROCK	
OTHER	

VIII - OPERATING SCHEDULE

HOURS per DAY	10
DAYS per WEEK	5
WEEK per YEAR	52
CAL. HRS per YR	2600
ACT. HRS per YR	2500

CAL. Hrs/Yr = Hr/Dy*Dy/Wk*Wk/Yr

IX - THROUGHPUT (tons per year)

ACTUAL ANNUAL	Varies	Tons/Yr.
HOURLY (average)	See Block VIII	TPH
MAX. DESIGN RATE	50.0	TPH

Hourly (average) = Annual (actual) / Actual Hours per Year (operated)

X - MOISTURE CONTENT (%)

MOISTURE CONTENT ENTERING SYS.: 0 %

XI - TYPE OF OPERATION AND / OR DEVICE

CODE	NAME OF DEVICE OR SYSTEM	CODE	NAME OF DEVICE OR SYSTEM
0	No Device	11	Screening, Wet Washing (Note 4)
1	Dump to Hopper, truck, pile (Note 2)	12	Silo, Filling - Pneumatic
2	Grizzly (Note 2)	13	Silo, Filling - Bucket Elevator
3	Hopper (Note 2)	14	Silo, discharge to Conveyor (Note 2)
4	Transfer Point (Note 2)	15	Silo, discharge to Tank Truck
5	Conveyor (Note 2)	16	Loading Open Top Truck (Note 2)
6	Crushing, Dry - Primary	17	Feeder
7	Crushing, Dry - Secondary	18	See Lookup Table "EmFac" for data
8	Crushing, Dry - Tertiary	19	See Lookup Table "EmFac" for data
9	Crushing, Wet (Note 3)	20	See Lookup Table "EmFac" for data
10	Screening, Dry	21	See Lookup Table "EmFac" for data

XII - TYPE OF EMISSION CONTROL EQUIPMENT

CODE	TYPE OF CONTROL	CODE	TYPE OF CONTROL
0	None	11	Gravel Bed Filters
1	Water Spray, Point of Application	12	Spray Tower (Low Efficiency)
2	Spray with Additives, Point of Application	13	Wet Scrubber (Med Efficiency)
3	Conveyor with Half Cover	14	Venturi Scrubber (High Efficiency)
4	Conveyor with Three Quarter Cover	15	Baghouse with Multiple Pickups
5	Conveyor with Full Cover	16	Baghouse with Single Pickup (Unenclosed)
6	Process Enclosure	17	Baghouse with Single Pickup (Partial Enclosed)
7	Gravity Separator	18	Baghouse with Single Pickup (Full Enclosed)
8	Cyclone - Simple	19	Baghouse with Single Pickup (Attached)
9	Cyclone - Multiple	20	Electrostatic Precipitator
10	Windscreen, Windward Side	21	See Lookup Table "ConEff" for data

XIII - EMISSION CALCULATIONS

EQUIPMENT ID NUMBER (A)	DEVICE CODE NO (B)	NAME OF DEVICE (C)	MOTOR BHP (D)	THROUGHPUT TONS / YEAR (E)	EMISSION CONTROL DEVICE CODE (F)	DsF (G)	NAME OF DEVICE (H)	EFF % (I)	EMISSION FACTORS POUNDS PER TON PM_{30} (J)	PM_{10} (K)	$PM_{2.5}$ (L)	EMISSION RATE TONS PER YEAR PM_{30} (M)	PM_{10} (N)	$PM_{2.5}$ (O)
83-001	12	Silo, Filling - Pneumatic	NA	3,710	19		Baghouse with Single Pickup (Attache	99.5	0.270	0.016	0.005	0.00	0.00	0.00
83-005	17	Feeder	2	3,650	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
83-005/006	4	Transfer Point (Note 2)	NA	3,650	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
83-096	17	Feeder	2	60	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
82-316	4	Transfer Point (Note 2)	NA	60	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
83-031	12	Silo, Filling - Pneumatic	NA	5,885	19		Baghouse with Single Pickup (Attache	99.5	0.270	0.016	0.005	0.00	0.00	0.00
83-093	4	Transfer Point (Note 2)	NA	4,554	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
83-111	17	Feeder	1	4,554	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
83-112	5	Conveyor (Note 2)	7.5	4,554	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
83-112	15	Silo, discharge to Tank Truck	1	4,554	18		Baghouse with Single Pickup (Full En	99.0	0.240	0.016	0.005	0.01	0.00	0.00
83-035	17	Feeder	2	2,074	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
83-035/036	4	Transfer Point (Note 2)	NA	2,074	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
83-095	17	Feeder	2	382	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
83-101	4	Transfer Point (Note 2)	1	382	18		Baghouse with Single Pickup (Full En	99.0	0.029	0.014	0.004	0.00	0.00	0.00
		No Device					None	0.0	0.000	0.000	0.000	0.00	0.00	0.00
		TOTAL HORSEPOWER	18.5											
		AVERAGE THROUGHPUT PER DEVICE		2,867										

BLOCK XIV - EMISSIONS & HARP INPUTS

EMISSION INVENTORY INPUTS

DEVICE DATA

PERMIT ID	T002009
NUMBER OF DEVICES	14
EQUIPMENT SIZE (bhp)	18.5

PROCESS DATA

PROCESS RATE (tpy)	Varies
MAX. DESIGN RATE (tph)	50
MAX. HOURLY PRODUCTION RATE (tph)	50
AVE. HOURLY PRODUCTION RATE (tph)	Need Actual Hours in 'CD21'

EMISSION DATA

	PM	PM_{10}	$PM_{2.5}$
ANNUAL EMISSIONS (tpy)			
UNCONTROLLED	2.218	0.291	0.091
CONTROLLED	0.016	0.003	0.001
EMISSION FACTOR (lb/ton)			
UNCONTROLLED	#VALUE!	#VALUE!	#VALUE!
CONTROLLED	#VALUE!	#VALUE!	#VALUE!
FRACTIONATION VALUE (PM10 or PM2.5 / PM)		0.1609	0.0505
OVERALL EFFICIENCY	#VALUE!	#VALUE!	#VALUE!

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS STOCKPILES	FORM MINE S-PILES

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc
FACILITY NAME: Plant

COMPANY NUMBER: 90
FACILITY NUMBER: 461

Device ID# 90015A

Name of / Number	Material Type	Stockpile Exposed Surface acres	Silt Loading %	Moisture (uncontrolled) %
Feeders 1-6	Limestone	1.9000	1.5	1.5
White & Blend	Limestone	3.2000	1.5	1.5
titan	Limestone	1.3000	1.5	1.5
OM 100	Limestone	2.3000	1.5	1.5
Fines Pile	Limestone	0.7000	1.5	1.5
Optical Sorter	Limestone	0.5000	1.5	1.5
			30	0.5
			30	0.5
			30	0.5
			30	0.5
			30	0.5
			30	0.5
			30	0.5
			30	0.5
			30	0.5
			30	0.5

Stockpile Name / Number	Dust Controls					
	Water Spray		Wind Screen	Other		
	check	gal/acre/day	check	check	Specify	Efficiency (%)
Feeders 1-6				x	Water Spray	75
White & Blend				x	Water Spray	75
titan				x	Water Spray	75
OM 100				x	Water Spray	75
Fines Pile				x	Water Spray	75
Optical Sorter				x	Water Spray	75
0						
0						
0						
0						
0						
0						
0						
0						
0						
0						

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS STOCKPILES	FORM MINE S-PILES

EMISSIONS

Device ID# 90015

SCC 30502507

Emission Factors (pounds per acres)

EmFac = J *1.7 * s/1.5 * (365 - P)/235 * I/15 * 365

J = Aerodynamic factor

s = Silt Loading (%)

P = Day per year with at least 0.01 inches of precipitation

I = Percent of time with wind speed >12mph (%)

Aerodynamic factor	
TSP =	1.0
PM_{10} =	0.5
$PM_{2.5}$ =	0.2

Stockpile	Throughput (acres) Material Type	Size (acres)
Feeders 1-6	Limestone	1.9000
White & Blend	Limestone	3.2000
titan	Limestone	1.3000
OM 100	Limestone	2.3000
Fines Pile	Limestone	0.7000
Optical Sorter	Limestone	0.5000
0	0	0.0000
0	0	0.0000
0	0	0.0000
0	0	0.0000
0	0	0.0000
0	0	0.0000
0	0	0.0000
0	0	0.0000
0	0	0.0000
0	0	0.0000
	TOTAL	9.9
Number of Devices	6	

Emission Factor - Uncontrolled (pounds/acre) TSP	PM_{10}	$PM_{2.5}$
854.530	427.265	170.906
854.530	427.265	170.906
854.530	427.265	170.906
854.530	427.265	170.906
854.530	427.265	170.906
854.530	427.265	170.906
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
854.530	427.265	170.906

Fractionation Value PM_{10}	$PM_{2.5}$
0.500	0.200
0.500	0.200
0.500	0.200
0.500	0.200
0.500	0.200
0.500	0.200
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.500	0.200

Stockpile	Controls Type	Efficiency (%)	Emission Factor - Controlled (pounds/acre) TSP	PM_{10}	$PM_{2.5}$
Feeders 1-6	Water Spray	75.00	213.632	106.816	42.726
White & Blend	Water Spray	75.00	213.632	106.816	42.726
titan	Water Spray	75.00	213.632	106.816	42.726
OM 100	Water Spray	75.00	213.632	106.816	42.726
Fines Pile	Water Spray	75.00	213.632	106.816	42.726
Optical Sorter	Water Spray	75.00	213.632	106.816	42.726
0	None	0.00	0.000	0.000	0.000
0	None	0.00	0.000	0.000	0.000
0	None	0.00	0.000	0.000	0.000
0	None	0.00	0.000	0.000	0.000
0	None	0.00	0.000	0.000	0.000
0	None	0.00	0.000	0.000	0.000
0	None	0.00	0.000	0.000	0.000
0	None	0.00	0.000	0.000	0.000
0	None	0.00	0.000	0.000	0.000
0	None	0.00	0.000	0.000	0.000
	TOTAL	75.00	213.632	106.816	42.726

Emissions (tpy) = Area * EmFac TSP	PM_{10}	$PM_{2.5}$
0.203	0.101	0.041
0.342	0.171	0.068
0.139	0.069	0.028
0.246	0.123	0.049
0.075	0.037	0.015
0.053	0.027	0.011
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000

	TSP	PM_{10}	$PM_{2.5}$
TOTAL	1.057	0.529	0.211

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS EXHAUST FROM STATIONARY AND PORTABLE FUEL COMBUSTION	FORM MINE EX-S&P

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc — COMPANY NUMBER: 90

FACILITY NAME: Plant — FACILITY NUMBER: 461

DISTRICT PERMIT NO.	DEVICE ID	CODE (See Code below)	EQUIPMENT TYPE	FUEL TYPE	UNITS OF USAGE	UNITS USED PER YEAR
b000767	41-014	14	INDUSTRIAL PROCESS	FUEL OIL #2 @ 0.05 % S	1000 GAL	0.2
b000767	41-014	15	INDUSTRIAL PROCESS	PROPANE, LPG	1000 GAL	0.000
B002001	42-014	14	INDUSTRIAL PROCESS	FUEL OIL #2 @ 0.05 % S	1000 GAL	24.8
B002001	42-014	15	INDUSTRIAL PROCESS	PROPANE, LPG	1000 GAL	0.0
B003936	44-027	15	INDUSTRIAL PROCESS	PROPANE, LPG	1000 GAL	0.813
B003936	44-027	14	INDUSTRIAL PROCESS	FUEL OIL #2 @ 0.05 % S	1000 GAL	0.183
B007678	37678	14	INDUSTRIAL PROCESS	FUEL OIL #2 @ 0.05 % S	1000 GAL	0.731
B007678	37678	15	INDUSTRIAL PROCESS	PROPANE, LPG	1000 GAL	0.165
			#N/A	#N/A	#N/A	
			#N/A	#N/A	#N/A	
			#N/A	#N/A	#N/A	
			#N/A	#N/A	#N/A	
			#N/A	#N/A	#N/A	
			#N/A	#N/A	#N/A	
			#N/A	#N/A	#N/A	

b000767	Roller Mill #1
B002001	Roller Mill #2
B003936	Roller Mill #3
B007678	Roller Mill #4

CODE	EQUIPMENT TYPE	FUEL TYPE	SCC
1	BOILER > 100 MMBTU/HR	NATURAL GAS	1-02-006-01
2	BOILER 10 - 100 MMBTU/HR	NATURAL GAS	1-02-006-02
3	BOILER <10 MMBTU/HR	NATURAL GAS	1-02-006-03
4	BOILER, COGENERATION	NATURAL GAS	1-02-006-06
5	BOILER	FUEL OIL #2 @ 0.5 % S	1-02-005-01
6	BOILER	FUEL OIL #2 @ 0.05 % S	1-02-005-01
7	BOILER	PROPANE, LPG	1-02-010-02
8	SPACE HEATER	NATURAL GAS	1-05-001-06
9	SPACE HEATER	FUEL OIL #2 @ 0.5 % S	1-05-001-05
10	SPACE HEATER	FUEL OIL #2 @ 0.05 % S	1-05-001-05
11	SPACE HEATER	PROPANE, LPG	1-05-001-10
12	INDUSTRIAL PROCESS	NATURAL GAS	3-05-900-03
13	INDUSTRIAL PROCESS	FUEL OIL #2 @ 0.5 % S	3-05-900-01
14	INDUSTRIAL PROCESS	FUEL OIL #2 @ 0.05 % S	3-05-900-01
15	INDUSTRIAL PROCESS	PROPANE, LPG	3-05-900-99
16	I. C. ENGINES	NATURAL GAS	2-03-002-04
17	I. C. ENGINES	FUEL OIL #2 @ 0.5 % S	2-02-017-xx
18	I. C. ENGINES	FUEL OIL #2 @ 0.05 % S	2-02-017-xx
19	I. C. ENGINES	PROPANE, LPG	2-02-017-xx
20	I. C. ENGINES	GASOLINE	2-02-017-20
21	GAS TURBINES	NATURAL GAS	2-02-002-01
22	GAS TURBINES - COGEN.	NATURAL GAS	2-02-002-03
23	GAS TURBINE	FUEL OIL #2 @ 0.5 % S	2-02-001-01
24	GAS TURBINE	FUEL OIL #2 @ 0.05 % S	2-02-001-01
25	User defined, see Worksheet "SFB"	0	0
26	User defined, see Worksheet "SFB"	0	0
27	User defined, see Worksheet "SFB"	0	0
28	User defined, see Worksheet "SFB"	0	0
29	User defined, see Worksheet "SFB"	0	0
30	User defined, see Worksheet "SFB"	0	0

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS EXHAUST FROM STATIONARY AND PORTABLE FUEL COMBUSTION	FORM MINE EX-S&P

EMISSIONS

EXHAUST FROM STATIONARY EQUIPMENT

PERMIT NO. / CODE	DEVICE ID	EQUIPMENT TYPE / FUEL TYPE	PROCESS RATE UNITS PER YEAR / UNITS	SOURCES CLASSIFICATION CODE SCC /CAS #	ORGANIC GASES TOG 43101	ORGANIC GASES FRAC ROG/VOC	CO 42101	NOx 42603	SOx 42401	PARTICULATE MATTER PM 11101	PARTICULATE MATTER FRAC PM_{10} / $PM_{2.5}$
					EMISSIONS FACTORS (pounds per unit of usage) / ANNUAL EMISSIONS (tons per year)						
b000767	41-014	INDUSTRIAL PROCESS	0.2	3-05-900-01	0.21	0.950	5	20	5.35	2	0.975
14		FUEL OIL #2 @ 0.05 % S	1000 GAL	Annual Emissions	0.000	0.000	0.000	0.002	0.000	0.000	0.000
b000767	41-014	INDUSTRIAL PROCESS	0.0	3-05-900-99	0.65	0.924	1.8	8.8	1.5	0.26	0.962
15		PROPANE, LPG	1000 GAL	Annual Emissions	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B002001	42-014	INDUSTRIAL PROCESS	24.8	3-05-900-01	0.21	0.950	5	20	5.35	2	0.975
14		FUEL OIL #2 @ 0.05 % S	1000 GAL	Annual Emissions	0.003	0.002	0.062	0.248	0.066	0.025	0.024
B002001	42-014	INDUSTRIAL PROCESS	0.0	3-05-900-99	0.65	0.924	1.8	8.8	1.5	0.26	0.962
15		PROPANE, LPG	1000 GAL	Annual Emissions	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B003936	44-027	INDUSTRIAL PROCESS	0.8	3-05-900-99	0.65	0.924	1.8	8.8	1.5	0.26	0.962
15		PROPANE, LPG	1000 GAL	Annual Emissions	0.000	0.000	0.001	0.004	0.001	0.000	0.000
B003936	44-027	INDUSTRIAL PROCESS	0.2	3-05-900-01	0.21	0.950	5	20	5.35	2	0.975
14		FUEL OIL #2 @ 0.05 % S	1000 GAL	Annual Emissions	0.000	0.000	0.000	0.002	0.000	0.000	0.000
B007678	37678	INDUSTRIAL PROCESS	0.7	3-05-900-01	0.21	0.950	5	20	5.35	2	0.975
14		FUEL OIL #2 @ 0.05 % S	1000 GAL	Annual Emissions	0.000	0.000	0.002	0.007	0.002	0.001	0.001
B007678	37678	INDUSTRIAL PROCESS	0.2	3-05-900-99	0.65	0.924	1.8	8.8	1.5	0.26	0.962
15		PROPANE, LPG	1000 GAL	Annual Emissions	0.000	0.000	0.000	0.001	0.000	0.000	0.000
0		#N/A	0.0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
0		#N/A	#N/A	Annual Emissions	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0		#N/A	0.0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
0		#N/A	#N/A	Annual Emissions	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0		#N/A	0.0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
0		#N/A	#N/A	Annual Emissions	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0		#N/A	0.0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
0		#N/A	#N/A	Annual Emissions	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0		#N/A	0.0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
0		#N/A	#N/A	Annual Emissions	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0		#N/A	0.0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
0		#N/A	#N/A	Annual Emissions	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0		#N/A	0.0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
0		#N/A	#N/A	Annual Emissions	0.000	0.000	0.000	0.000	0.000	0.000	0.000

TOTAL EMISSIONS	TOG	ROG / VOC	CO	NOx	SOx	PM	PM_{10} / $PM_{2.5}$
Tons per Year	0.003	0.003	0.066	0.263	0.070	0.026	0.025

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS EXHAUST FROM MOBILE AND VEHICULAR EQUIPMENT	FORM MINE EX-M

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc — COMPANY NUMBER: 90

FACILITY NAME: Plant — FACILITY NUMBER: 461

DEVICE # **90001,2**

PROCESS NUMBER	CODE (See Code below)	EQUIPMENT TYPE	FUEL TYPE	UNITS OF USAGE	UNITS USED PER YEAR
1	1	HEAVY DUTY - OFF ROAD *	DIESEL	1000 hp-hr	329.0
2	5	LIGHT DUTY VEHICLES ***	GASOLINE	1000 VMT	19.0
3	7	Terex low Emission Retro-Fit	Diesel	1000 hp-hr	3,297.0
20		#N/A	#N/A	#N/A	

CODE	EQUIPMENT TYPE	FUEL TYPE		SCC
1	HEAVY DUTY - OFF ROAD *	DIESEL	1000 hp-hr	3-05-025-99
2	HEAVY DUTY - OFF ROAD *	GASOLINE	1000 hp-hr	3-05-025-99
3	MISC - OFF ROAD **	NG / LPG	1000 hp-hr	3-05-025-99
4	LOCOMOTIVES	DIESEL	1000 GAL	3-05-025-99
5	LIGHT DUTY VEHICLES ***	GASOLINE	1000 VMT	3-05-025-99
6	HEAVY DUTY - ON ROAD ****	DIESEL	1000 VMT	3-05-025-99
7	Terex low Emission Retro-Fit	Diesel	1000 hp-hr	3-05-025-99
15	User defined, see Lookup Table	0	0	0

* OFF ROAD INCLUDES MINING AND EARTH MOVING EQUIPMENT
** MISC - OFF ROAD INCLUDES NG/LPG LOADER, FORKLIFTS, ETC.
*** LIGHT DUTY INCLUDES CARS, VAS, SMALL TRUCKS, ECT.
**** ON ROAD INCLUDES TRUCKS, ETC .

1000 hp-hr = THOUSAND OF HORSEPOWER HOURS
1000 GAL = THOUSAND OF GALLONS OF LIQUID FUEL
1000 VTM = THOUSAND VEHICLE MILES TRAVELED
MMCF = MILLION OF CUBIC FEET OF NATURAL GAS

EMISSIONS

DEVICE # 90001,2

PROCESS ID	CODE	EQUIPMENT TYPE	PROCESS RATE UNITS PER YEAR / UNITS	SOURCES CLASSIFICATION CODE SCC /CAS #	ORGANIC GASES TOG 43101	FRAC ROG / VOC	CO 42101	NOx 42603	SOx 42401	PARTICULATE MATTER PM 11101	FRAC PM_{10} / $PM_{2.5}$
					EMISSIONS FACTORS (pounds per unit of usage) / ANNUAL EMISSIONS (tons per year)						
1	1	HEAVY DUTY - OFF ROAD *	329	3-05-025-99	2.42	0.9676	7.50	24.25	2.91	1.54	0.994
			1000 hp-hr	Annual Emissions	0.398	0.385	1.234	3.989	0.479	0.253	0.252
2	5	LIGHT DUTY VEHICLES ***	19	3-05-025-99	2.92	0.914	18.79	2.32	0.12	0.47	0.45
			1000 VMT	Annual Emissions	0.028	0.025	0.179	0.022	0.001	0.004	0.002
3	7	Terex low Emission Retro-Fit	3297	3-05-025-99	0.44	0.97	1.1	15.2	2.9	0.24	0.99
			1000 hp-hr	Annual Emissions	0.725	0.704	1.813	25.057	4.781	0.396	0.392

	TOG	ROG / VOC	CO	NOx	SOx	PM	PM_{10} / $PM_{2.5}$
TOTAL EMISSIONS	1.151	1.114	3.226	29.068	5.260	0.653	0.646

EMISSION YEAR 200 **8**	HARP / CEIDARS MINING OPERATIONS PAVED ROADS - ENTRAINED DUST	FORM MINE PROAD

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc
FACILITY NAME: Plant
COMPANY NUMBER: 90
FACILITY NUMBER: 461

DEVICE #

Process Number	Vehicle type	Weigh (tons) Empty	Loaded	Mean	Distance Traveled per Year (vmt) Round Trip miles	Trips per Day	Days per Year	Miles per Year	Silt Loading grams / sq meter
1				0.0				0.0	100
2				0.0				0.0	100
3				0.0				0.0	100
4				0.0				0.0	100
5				0.0				0.0	100
6				0.0				0.0	100
7				0.0				0.0	100
8				0.0				0.0	100
9				0.0				0.0	100
10				0.0				0.0	100
11				0.0				0.0	100
12				0.0				0.0	100

Vehicle Type	Dust Control Method None	Boom Sweeping	Vacuum Sweeping with at lease 12,000 cfm	Control Method (check one) Water Only	Water+Sweeping	Number of Vehicle Pass Since Last Treatment
0	X					100
0	X					100
0	X					100
0	X					100
0	X					100
0	X					100
0	X					100
0	X					100
0	X					100
0	X					100
0	X					100
0	X					100

Topical Silt Loading Paved Surface	gram / meter sq.
Freeway	0.1
Heavy Traffic	0.1
Low Traffic Road	0.4
Solid Waste Landfill	7.4
Quarry	8.2
Concrete Batching	12
Sand & Gravel Plant	70
Industrial Site	100
District Default	100
Asphalt Batching	120
Site - Specific	
Site - Specific	
Site - Specific	
Site - Specific	

EMISSIONS

DEVICE # 0 SCC 3-05-025-99

Emission Factors pounds / vmt

EmFac = [k*(sL / 2)^0.65 * (W / 3)^1.5 - C] (1 - P/(4*N))

k = Aerodynamic Factor
sL = Silt Loading (%)
W = Mean weight (tons)
C = Correction factor for fleet exhaust, brake, wear and tire wear - lbs/vmt

Factors	Aerodynamic	Correction
TSP =	0.082	0.00047
PM_{10} =	0.016	0.00047
$PM_{2.5}$ =	0.004	0.00036

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS PAVED ROADS - ENTRAINED DUST	FORM MINE PROAD

P = Day per year with at least 0.01 inches of precipitation - See MetData
N = Number of days in averaging period or 365

Throughput		Emission Factors Uncontrolled (pounds/vmt)		
Vehicle Type	vmt	PM	PM_{10}	PM_{10}
0	0.0	0.000	0.000	0.000
0	0.0	0.000	0.000	0.000
0	0.0	0.000	0.000	0.000
0	0.0	0.000	0.000	0.000
0	0.0	0.000	0.000	0.000
0	0.0	0.000	0.000	0.000
0	0.0	0.000	0.000	0.000
0	0.0	0.000	0.000	0.000
0	0.0	0.000	0.000	0.000
0	0.0	0.000	0.000	0.000
0	0.0	0.000	0.000	0.000
0	0.0	0.000	0.000	0.000
TOTAL	0.0	#DIV/0!	#DIV/0!	#DIV/0!
Number of Devices	0			

Fractionation Value	
PM_{10}	PM_{10}
1.000	0.766
1.000	0.766
1.000	0.766
1.000	0.766
1.000	0.766
1.000	0.766
1.000	0.766
1.000	0.766
1.000	0.766
1.000	0.766
1.000	0.766
1.000	0.766
#DIV/0!	#DIV/0!

Controls

Broom Sweeping
C = 20 - (0.231*V)

Vacuum Sweeping
C = 45 - (0.236*V)

Water Flushing
C = 69 - (0.231 * V)

Water Flushing + Sweeping
C = 96 - (0.263 * V)

C = Control Efficiency (%)
V = Number of Vehicles passes since last treatment

Emissions

EmFac * vmt / 2000

Vehicle Type	Efficiency (%)	Emission Factor - Controlled (pounds/vmt)		
		PM	PM_{10}	PM_{10}
0	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000
0	0.000	0.000	0.000	0.000
	TOTAL	#DIV/0!	#DIV/0!	#DIV/0!

	Emissions (tpy)		
	TSP	PM_{10}	PM_{10}
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
	0.000	0.000	0.000
TOTAL	0.000	0.000	0.000

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS UNPAVED ROADS - ENTRAINED DUST	FORM MINE UPR

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc — COMPANY NUMBER: 90

FACILITY NAME: Plant — FACILITY NUMBER: 461

DEVICE # **90013**

Process Number	Vehicle type	Road Type * Ind / Pub	Vehicle Weigh (tons) Empty	Loaded	Mean	Distance Traveled per Year (vmt) Round Trip Miles	Trips per Day	Days per Year	Miles per Year	Mean Vehicle Sped (mph)	Silt Loading * %	Moisture %
1	Loader	Ind	100	116	108.0	0.03	25	260	195.0	15	10	0.5
2	Vacum Truck	Ind	22.75	22.75	22.8	0.1	3.7	260	96.2	15	10	0.5
3	Forklift	Ind	8.5	9.5	9.0	0.05	9.5	260	123.5	15	10	0.5
4	Dump Truck	Ind	27.5	47.6	37.6	0.24	5.2	260	324.5	15	10	0.5
5	Lube van	Ind	20	20	20.0	9.1	1.6	130	1,892.8	15	10	0.5
6	Fuel truck	Ind	10	20	15.0	7.2	0.9	52	337.0	15	10	0.5
7	WaterTruck	Ind	50	80	65.0	4.8	1.4	260	1,747.2	15	10	0.5
8					0.0				0.0		11	0.2
9					0.0				0.0		11	0.2
10					0.0				0.0		11	0.2
11					0.0				0.0		11	0.2
12					0.0				0.0		11	0.2

* Road Type
Ind = Unpaved road surfaces a industrial sites
Pub = Publicly accessible roadways dominated by light duty vehicles

* For other Silt Loadings % is cells 'A167' through 'D178'.

Process Number	Vehicle Type	Road Type	Dust Control Method (Check "X" only one method per emission source (row) and complete appropriate cells below) Method Cells	None none	Water D52-D63 or E52-G63	Water with Suppressants H52 - M63	Surface Improvement D70 - E 81	Wind Screens or Wind Breaks G70 - H81	Other I70 - M81
1	Loader	Ind			x				
2	Vacum Truck	Ind			x				
3	Forklift	Ind			x				
4	Dump Truck	Ind				x			
5	Lube van	Ind				x			
6	Fuel truck	Ind				x			
7	WaterTruck	Ind				x			
8	0	0							
9	0	0							
10	0	0							
11	0	0							
12	0	0							

Process Number	Vehicle Type	Road Type	Dust Control Method: Water (Either new moisture content or application rate) New Surface Moisture Content (%)	Water Application Rate: Traffic Rate vehicles per hour	Hours between Application	Intensity of water gallons / sq yd of Roadway *	Water with Suppressant: Type or Name of Suppressant	Intensity of Suppressant Gallons / sq yd of Roadway *	Frequency of Application (Check (X) only one): Weekly Ever 7 days	Bi-Weekly Every 14 days	Monthly Every 30 - 31 days	Bi-Monthly Every 61 day
1	Loader	Ind		4.4	4		MgCI	0.15			x	
2	Vacum Truck	Ind		3	4		MgCI	0.15			x	
3	Forklift	Ind		1.3	4		MgCI	0.15			x	
4	Dump Truck	Ind		4.7	4		MgCI	0.15			x	
5	Lube van	Ind	3	58.7	4	0.2						
6	Fuel truck	Ind	1.5	3	4	0.1						
7	WaterTruck	Ind										
8	0	0										
9	0	0										
10	0	0										
11	0	0										
12	0	0										

(* 0.1 gallons of water or suppressant per square yard of road = 1760 gallons per mile of a 30 foot wide road.)

Process Number	Vehicle Type	Road Type	Dust Control Method: Surface Improvement New Silt Content (%) 3 Months after Application	6 Months after Application	Average	Wind Screens or Wind Breaks Height (feet)	Width (feet)	Other: Name/Type	Description	Control Efficiency (%)
1	Loader	Ind			10				MgCI	75
2	Vacum Truck	Ind			10				MgCI	75
3	Forklift	Ind			10				MgCI	75
4	Dump Truck	Ind			10				MgCI	75
5	Lube van	Ind			10				Water Truck	50
6	Fuel truck	Ind			10				Water truck	50
7	WaterTruck	Ind			10					
8	0	0			11					
9	0	0			11					
10	0	0			11					
11	0	0			11					
12	0	0			11					

EMISSIONS

DEVICE # 90014

Emission Factor pounds per vehicle miles traveled

Industrial Roads

EmFac = k * (s / 12)^a * (W / 3)^b

Public Road

EmFac = k * ({[(s / 12)^a * (S / 30)^d] / (M / 0.5)^c} -C)*[(365 - P)/365]

k, a, b, c, & d = Constants - See Lookup Table entitled "Constants for Emission Factor Equations"

s = Silt content of unpaved surface in percent (%)

W = Average vehicle weight in tons

S = Mean vehicle speed (mph)

M = Moisture content of unpaved surface in percent (%)

P = Number of days per year with at least 0.01 inches of precipitation - see MetData worksheet Cell ' C16.

Process Number	Vehicle Type	Throughput Road Type	vmt	Emission Factors Uncontrolled (pounds / vmt) PM	PM_{10}	PM_{10}
1	Loader	Ind	195.0	21.632	6.385	0.979
2	Vacum Truck	Ind	96.2	10.733	3.168	0.486
3	Forklift	Ind	123.5	7.071	2.087	0.320
4	Dump Truck	Ind	324.5	13.447	3.969	0.609
5	Lube van	Ind	1,892.8	10.128	2.989	0.458
6	Fuel truck	Ind	337.0	8.898	2.626	0.403
7	WaterTruck	Ind	1,747.2	17.214	5.081	0.779
8	0	0	0.0	0.000	0.000	0.000
9	0	0	0.0	0.000	0.000	0.000
10	0	0	0.0	0.000	0.000	0.000
11	0	0	0.0	0.000	0.000	0.000
12	0	0	0.0	0.000	0.000	0.000
		TOTAL	4,716.1	13.302	3.926	0.602
	Number of Devices	7				

Fractionation Value PM_{10}	PM_{10}
0.295	0.045
0.295	0.045
0.295	0.045
0.295	0.045
0.295	0.045
0.295	0.045
0.295	0.045
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.000	0.000
0.295	0.045

Process Number	Vehicle Type	Road Type	Efficiency percentage (%) of Dust Control Methods None	Water New Surface Moisture Content (%)	Water Application Rate *	Water with Suppressants	Surface Improvement	Wind Screens or Wind Breaks	Other	Overall
1	Loader	Ind	0.00	0.00	0.00	75.00	0.00	0.00	75.00	75.00
2	Vacum Truck	Ind	0.00	0.00	0.00	75.00	0.00	0.00	75.00	75.00
3	Forklift	Ind	0.00	0.00	0.00	75.00	0.00	0.00	75.00	75.00
4	Dump Truck	Ind	0.00	0.00	0.00	75.00	0.00	0.00	75.00	75.00
5	Lube van	Ind	0.00	95.00	-5.66	E	0.00	0.00	50.00	95.00
6	Fuel truck	Ind	0.00	81.67	89.20	E	0.00	0.00	50.00	89.20
7	WaterTruck	Ind	0.00	0.00	0.00	E	0.00	0.00	0.00	0.00
8	0	0	0.00	0.00	0.00	E	0.00	0.00	0.00	0.00
9	0	0	0.00	0.00	0.00	E	0.00	0.00	0.00	0.00
10	0	0	0.00	0.00	0.00	E	0.00	0.00	0.00	0.00
11	0	0	0.00	0.00	0.00	E	0.00	0.00	0.00	0.00
12	0	0	0.00	0.00	0.00	E	0.00	0.00	0.00	0.00

* Dust Controls - Water Application Rate

C = 100 - (0.0012 * A * D * T) / I

C = Control efficiency (%)

A = pan evaporation rate (inches)

D = Vehicles per hour

T = Hours between watering

I = Gallons / sq. yd (Note 0.1 gallon/sq yd = 1760 gallons per mile for a 30 foot wide road.)

Process Number	Vehicle Type	Road Type	Efficiency (%)	Emission Factor - Controlled (pounds/vmt) PM	PM_{10}	$PM_{2.5}$
1	Loader	Ind	75.00	5.408	1.596	0.245
2	Vacum Truck	Ind	75.00	2.683	0.792	0.121
3	Forklift	Ind	75.00	1.768	0.522	0.080
4	Dump Truck	Ind	75.00	3.362	0.992	0.152
5	Lube van	Ind	95.00	0.506	0.149	0.023
6	Fuel truck	Ind	89.20	0.961	0.284	0.043
7	WaterTruck	Ind	0.00	17.214	5.081	0.779
8	0	0	0.00	0.000	0.000	0.000
9	0	0	0.00	0.000	0.000	0.000
10	0	0	0.00	0.000	0.000	0.000
11	0	0	0.00	0.000	0.000	0.000
12	0	0	0.00	0.000	0.000	0.000
		TOTAL	56.26	7.205	2.127	0.326

Emissions (tpy) PM	PM_{10}	$PM_{2.5}$
0.527	0.156	0.024
0.129	0.038	0.006
0.109	0.032	0.005
0.545	0.161	0.025
0.479	0.141	0.022
0.162	0.048	0.007
15.038	4.439	0.681
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000

TOTAL	16.990	5.015	0.769

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROADS	FORM MINE ERO

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc — COMPANY NUMBER: 90

FACILITY NAME: Plant — FACILITY NUMBER: 461

DEVICE # **90014a**

Process Number	Parking Areas acres	Disturbed Areas acres	Vegetative cover fraction	Moisture Natural %	Threshold Friction Velocity Area Use Code *	Threshold Friction Velocity Usage Name	Ratio of Wind Speed to Friction Velocity Area Use Code **	Ratio of Wind Speed to Friction Velocity Usage Name
1	0	1.8	0	0.5	3	Construction Site	3	Moderate Industrial / Mining
2	0	0.28	0	0.5	3	Construction Site	3	Moderate Industrial / Mining
3	0	2.9	0	0.5	3	Construction Site	3	Moderate Industrial / Mining
4				0.5		None		None
5				0.5		None		None
6				0.5		None		None
7				0.5		None		None
8				0.5		None		None
9				0.5		None		None
10				0.5		None		None

* Threshold Friction Velocity Code	Area Usage	** Ration of Wind Speed to Friction Velocity Code	Area Usage
0	None	0	None
1	Mine Tailings	1	Open Space
2	Abandoned Agricultural Land	2	Light Industrial / Mining
3	Construction Site	3	Moderate Industrial / Mining
4	Disturbed Desert	4	Heavy Industrial / Mining
5	Scrub Desert	5	User Defined
6	Coal Dust	6	User Defined
7	Active Agricultural Land	7	User Defined
8	Coal Pile	8	User Defined
9	User Defined	9	User Defined
10	User Defined	10	User Defined
11	User Defined		
12	User Defined		

Process Number	Total Parking and Disturbed Areas	Dust Controls (Check 'x' only one method) None check (x)	Water Spray check (x)	Water Added gallons per acre per day	New Surface Moisture Content (%) Calculated from Added Water	As Measured (%)	Moisture Content for Calculation	Wind Screen check (x)	Other check (x)	Other Specify	Efficiency (%)
1	1.8				-0.32		0.00		x	MgCl	75
2	0.28		x	800	7.04		7.04				
3	2.9				-0.32		0.00		x	MgCl	75
4	0	x			-0.32		0.00				
5	0	x			-0.32		0.00				
6	0	x			-0.32		0.00				
7	0	x			-0.32		0.00				
8	0	x			-0.32		0.00				
9	0	x			-0.32		0.00				
10	0	x			-0.32		0.00				

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROADS	FORM MINE ERO

EMISSIONS

DEVICE # **90014a**

Emission Factor - pounds per acre
EmFac = 2.814 * k *(1 - v) * (u / u_t)^3 * C(x)*2000

k = Aerodynamic Factor for Particulate Size
v = Amount of Vegetative cover as a Fraction
u = Mean Wind Speed in Meters per Second (m/s)
u_t = Threshold Value of Wind Speed (m/s)
C(x) = Correction Factor

Aerodynamic Factor
TSP = 1.0
PM_{10} = 0.5
$PM_{2.5}$ = 0.2

x = u_t/u

Threshold Value of Wind Speed - u_t
$u_t = u^*_t * u^*$

Process Number	Throughput: Parking Areas (Acres)	Throughput: Disturbed Area (Acres)	Threshold Friction Velocity u^*_t (m/s)	Ratio u^*	Threshold Wind Speed u_t (m/s)	x	Correction Factor C(x)	Emission Factors TSP (pounds/acre)	Emission Factors PM_{10} (pounds/acre)	Emission Factors $PM_{2.5}$ (pounds/acre)
1	0	1.8	0.26	6.5	1.69	0.44	1.90	90,332.145	45,166.072	18,066.429
2	0	0.28	0.26	6.5	1.69	0.44	1.90	90,332.145	45,166.072	18,066.429
3	0	2.9	0.26	6.5	1.69	0.44	1.90	90,332.145	45,166.072	18,066.429
4	0	0	0	0	0	0.00	0.00	0.000	0.000	0.000
5	0	0	0	0	0	0.00	0.00	0.000	0.000	0.000
6	0	0	0	0	0	0.00	0.00	0.000	0.000	0.000
7	0	0	0	0	0	0.00	0.00	0.000	0.000	0.000
8	0	0	0	0	0	0.00	0.00	0.000	0.000	0.000
9	0	0	0	0	0	0.00	0.00	0.000	0.000	0.000
10	0	0	0	0	0	0.00	0.00	0.000	0.000	0.000
	INPUTS	4.98						90,332.145	45,166.072	18,066.429
	Number of Devices	0								

Process Number	Total Parking and Disturbed Areas Acres	Fractionation Value PM_{10}	Fractionation Value $PM_{2.5}$
1	1.8	0.5	0.2
2	0.28	0.5	0.2
3	2.9	0.5	0.2
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
	INPUTS	0.5	0.2

Process Number	Total Parking and Disturbed Areas Acres	Controls Type	Controls Efficiency (%)	Emission Factor - Controlled (pounds/acre) TSP	PM_{10}	$PM_{2.5}$
1	1.8	MgCl	75.0	22,583.036	11,291.518	4,516.607
2	0.28	Water Spray	95.0	4,516.607	2,258.304	903.321
3	2.9	MgCl	75.0	22,583.036	11,291.518	4,516.607
4	0	None	0.0	0.000	0.000	0.000
5	0	None	0.0	0.000	0.000	0.000
6	0	None	0.0	0.000	0.000	0.000
7	0	None	0.0	0.000	0.000	0.000
8	0	None	0.0	0.000	0.000	0.000
9	0	None	0.0	0.000	0.000	0.000
10	0	None	0.0	0.000	0.000	0.000
		INPUTS	76.12	21,567.253	10,783.626	4,313.451

Emissions (tpy) = Area * EmFac TSP	PM_{10}	$PM_{2.5}$
20.325	10.162	4.065
0.632	0.316	0.126
32.745	16.373	6.549
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
TOTAL 53.702	26.851	10.740

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS TOTAL EMISSIONS	FORM MINE TOTAL

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc   COMPANY NUMBER: 90

FACILITY NAME: Sentinel Quarry   FACILITY NUMBER: 461

TOTAL

EMISSION SOURCE / OPERATION / ACTIVITY	DEVICE ID #	CRITERIA EMISSIONS (tons per year)							
		TSP	PM_{10}	$PM_{2.5}$	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	90010	0.225	0.180	0.180					
BLASTING	90011	10.417	5.417	0.312					
EXPLOSIVES	30502514				2.948	0.748	0.000		
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	90012	0.049	0.024	0.007					
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	90006,7,8,9	0.278	0.135	0.041					
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	751	6.075	1.064	0.330					
STOCKPILES - WIND EROSION	90015	0.671	0.336	0.134					
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	VARIOUS	0.027	0.026	0.026	0.082	0.375	0.030	0.026	0.001
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	90001,2	0.634	0.630	0.630	5.205	13.581	1.679	1.625	2.020
UNPAVED ROADS - ENTRAINED DUST	90013	104.891	29.916	4.587					
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROADS	90014	37.262	18.631	7.452					

	TSP	PM_{10}	$PM_{2.5}$	CO	NOx	TOG	ROG / VOC	SOx
GRAND TOTAL	160.528	56.358	13.700	8.235	14.704	1.709	1.652	2.021

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS FACILITY INFORMATION	FORM MINE FAC

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc
FACILITY NAME: Sentinel Quarry
FACILITY LOCATION (address): 7225 Crystal Creek Road
CITY: Lucerne Valley
STATE: CA ZIP: 92356

COMPANY NUMBER: 90
FACILITY NUMBER: 461
FACID: 9000461

MAILING ADDRESS: P.O. Box 825
CITY: Lucerne Valley
STATE: CA ZIP: 92356

CONTACT PERSON: Christine Granquist
TELEPHONE NUMBER: 760-248-5223 EXT:
FAX NUMBER: 760-248-9115
EMAIL: christine.granquist@omya.com

MINE TYPE AND PARAMETERS

TYPE OF MINE	Quarry	(Quarry, Surface, Pit, Bank Run, Shaft, Etc.)
TYPE OF MATERIAL MINED	Limestone	(Limestone, Talc, Salts, Sand, Gravel, Rock, Volcanic Cinders, Gold, Silver, Iron Ore, Rear Earth, Etc.)
OVERBURDEN RATIO	1.2:1	Tons of Overburden per Ton of Ore

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS MINERALS HANDLED - AMOUNT & CHARACTERISTICS	FORM MINE MIN

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc
COMPANY NUMBER: 90
FACILITY NAME: Sentinel Quarry
FACILITY NUMBER: 461

Name of Minerals	Amounts (tpy)		Characteristics	
	Shifted by Blasting	Total Handled	Moisture (%)	Silt (%)
Limestone	449,672	449,672	1.5	4.4
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
TOTAL	449,672	449,672		

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS METEOROLOGICAL DATA	FORM MINE MET-D

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc — COMPANY NUMBER: 90

FACILITY NAME: Sentinel Quarry — FACILITY NUMBER: 461

Parameter	Value	Description	Default Value
Mean Wind Speed	7.7	mph	7.7
u	3.4	meters per second	
Precipitation	40.0	Day per year with at least 0.01 inches of precipitation	20.0
Wind Speed	13.3	Percent of time with wind speed >12mph (%)	13.3
Evaporation	75.0	Annual Pan Evaporation Rate in inches	75.0

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS DRILLING AND BLASTING	FORM MINE D&B

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc — COMPANY NUMBER: 90
FACILITY NAME: Sentinel Quarry — FACILITY NUMBER: 461

Device ID# 90010 DRILLING
Device ID# 90011 BLASTING

Blast per year	12	number
Holes per Blast - Average	79	number
Holes drilled per year	948	Number of holes per year
Area Shifted per Blast - Average	22,930	square foot per blast - average
Area Shifted per Year	275,160	square foot per year
Amount shifted by blasting	449,672	Tons Ore, Waste & Overburden

EMISSIONS

DRILLING

Device ID# 90010

SCC 30502514 — By Amount Shifted

Annual Throughput 449,672 Tons Shifted

Emission Factors (pounds per tons shifted)			Fractionation Value	
TSP	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
0.001	0.0008	0.0008	0.800	0.800

Controls
None, assumed wet drilling

Emissions - tons per year		
TSP	PM_{10}	$PM_{2.5}$
0.225	0.180	0.180

SCC 30502514 — By Number of Holes Drilled

Annual Throughput 948 Holes Drilled

Emission Factors (pounds per hole drilled)			Fractionation Value	
TSP	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
1.3	0.68	0.68	0.523	0.523

Controls
None, assumed wet drilling

Emissions - tons per year		
TSP	PM_{10}	$PM_{2.5}$
0.616	0.322	0.322

BLASTING

Device ID# 90011

By Tons Shifted

Annual Throughput 449,672 Tons Shifted
SCC 30502514

Emission Factors (pounds per ton shifted)			Fractionation Value	
TSP	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
0.160	0.080	0.005	0.500	0.030

Controls
None

Emissions - tons per year Em = EmFac * Amount Shift		
TSP	PM_{10}	$PM_{2.5}$
35.97376	17.98688	1.0792128

By Square Foot Shifted

Area Shifted per Blast - Average 22,930 square foot per blast - average
Area Shifted per Year 275,160 square foot per year
SCC 30502514

Emission Factors (pounds per blast) *			Fractionation Value	
TSP	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
1736.105	902.775	52.083	0.520	0.030

* $EmFac = k * 0.0005 * A^{1.5}$ — 35.71428571

k = Aerodynamic Factor
TSP = 1.00
PM_{10} = 0.52
$PM_{2.5}$ = 0.03
A = Area Shifted per Blast - Average

Controls
None

Emissions - tons per year Em = EmFac * Blast per Year		
TSP	PM_{10}	$PM_{2.5}$
10.417	5.417	0.312

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS EXPLOSIVES	FORM MINE EXPL

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc — COMPANY NUMBER: 90

FACILITY NAME: Sentinel Quarry — FACILITY NUMBER: 461

Device ID# 90011

Code * See Codes below	Type	Composition	Amount tons/ year
6	ANFO	Ammonium Nitrate, Fuel Oil	88
	None	None	

* Codes for Explosive Code	Explosive
0	None
1	Black Powder
2	Smokeless Powder
3	Dynamite, Straight
4	Dynamite, Ammonia
5	Dynamite, Gelatin
6	ANFO
7	TNT
8	RDX
9	PETN
10	User Defined
11	User Defined
12	User Defined

EMISSIONS

Device ID# 90011 SCC 30502514

Explosive Code	Type	Amount tons/ year	Emission Factor pounds per ton CO	NOx	TOG	Emission Rate ton per year CO	NOx	TOG
6	ANFO	88.000	67	17	0	2.948	0.748	0.000
0	None	0.000	0	0	0	0.000	0.000	0.000
	INPUTS	88.000	67.000	17.000	0.000			
	Number of Devices	1						
					INPUTS	2.948	0.748	0.000

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS BULLDOZING, SCRAPING AND GRADING OF MATERIAL	FORM MINE BSG

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc
FACILITY NAME: Sentinel Quarry

COMPANY NUMBER: 90
FACILITY NUMBER: 461

Device ID# 90012

Name of Material	Hours of Operations (hours per year)					Controls			
	Bulldozing	Scraping	Grading	Other	Total	None	Water Spray		Wind Screen
						Check	Check	New Moisture (%)	Check
Limestone	24				24		X	3	
0					0				

EMISSIONS

Device ID# 90012

SCC 30502599

Emission Factors (pounds per hours of operations)
EmFac = 2.76 * k *(s)^1.5 / (M)^1.4
k = Aerodynamic Factor
s = silt content (%)
M = Moisture content (%)

Aerodynamic factors
TSP = 0.74
PM_{10} = 0.36
$PM_{2.5}$ = 0.11

Material	Hours of Operations	Emission factors - Uncontrolled (pounds per hour)		
		TSP	PM_{10}	$PM_{2.5}$
Limestone	24	10.685	5.198	1.588
0	0	0.000	0.000	0.000
TOTAL	24	10.685	5.198	1.588
Number of Devices	1			

Fractionation Value	
PM_{10}	$PM_{2.5}$
0.486	0.149
0.000	0.000
0.486	0.149

Material	Control		Emission factors - Controlled (pounds per hour)		
	Type	Efficiency (%)	TSP	PM_{10}	$PM_{2.5}$
Limestone	Water Spray	62.107	4.049	1.970	0.602
0	None	0.000	0.000	0.000	0.000
	TOTAL	62.11	4.049	1.970	0.602

	Emissions - tons per year		
	TSP	PM_{10}	$PM_{2.5}$
	0.049	0.024	0.007
	0.000	0.000	0.000
TOTAL	0.049	0.024	0.007

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS LOADING OF MATERIAL(S) AT MINE / QUARRY / PIT	FORM MINE LOAD

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc — COMPANY NUMBER: 90

FACILITY NAME: Sentinel Quarry — FACILITY NUMBER: 461

DEVICE # 90006,7,8,9

Name of Material	Amount Loaded tpy
Limestone	672,384
0	

Controls						
None	Water Spray		Wind Screen		Other	
Check	Check	New Moisture (%)	Check	Check	Specify	Efficiency (%)
	x	3				

EMISSIONS

Device ID# 90006,7,8,9 SCC 30502506

Emission Factors (pounds per ton)

EmFac =0.0032 * k *(U/5)^1.3 / (M/2)^1.4

k = Aerodynamic Factor

U = Mean wind speed in miles per hour

M = Moisture content (%)

Aerodynamic factors

TSP = 0.74

PM_{10} = 0.36

$PM_{2.5}$ = 0.11

Material	Amount Loaded tpy
Limestone	672,384
0	0
TOTAL	672,384
Number of Devices	1

Emission factors - Uncontrolled (pounds per ton)		
TSP	PM_{10}	$PM_{2.5}$
0.002	0.001	0.000
0.000	0.000	0.000
0.002	0.001	0.000

Fractionation Value	
PM_{10}	$PM_{2.5}$
0.486	0.149
0.000	0.000
0.486	0.149

Material	Control		Emission factors - Controlled (pounds per ton)		
	Type	Efficiency (%)	TSP	PM_{10}	$PM_{2.5}$
Limestone	Water Spray	62.107	0.001	0.000	0.000
0	None	0.000	0.000	0.000	0.000
	TOTAL	62.11	0.001	0.000	0.000

	Emissions - tons per year		
	TSP	PM_{10}	$PM_{2.5}$
	0.278	0.135	0.041
	0.000	0.000	0.000
TOTAL	0.278	0.135	0.041

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS AGGREGATE HANDLING, CRUSHING & SCREENING #1	FORM MINE AGG-1

I - COLOR CODE

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

II - MANDATORY INFORMATION

FLOW DIAGRAM
BLOCK III - ALL ITEMS
BLOCK VIII - ACTUAL HOURS OPERATED
BLOCK IX - ANNUAL THROUGHPUT (tpy)
BLOCK X - MOISTURE CONTENT (%) OF MATERIAL ENTERING THE SYSTEM
BLOCK XIII, COLUMNS 'B', 'E', 'F' & 'G'

III - FACILITY INFORMATION

COMPANY NAME	Omya California Inc	COMPANY #	90	PERMIT #	B 0 0 0 7 5 1
FACILITY NAME	Sentinel Quarry	FACILITY #	461	DEVICE ID	751
PROCESS NAME	Crushing Screening Circuit	INVENTORY ID #	9000461	PROCESS ID	

IV - MAP COORDINATES FOR PROCESS

UTM ZONE 11 | UTM EAST (km) 5 0 5 . 3 1 6 | UTM NORTH (km) 3 8 0 4 . 4 1 5
LATITUDE (deg.) 3 4 . 3 8 3 7 | LONGITUDE (deg.) 1 1 6 . 9 4 2 2

V - TYPE OF PLANT

STATIONARY	x
PORTABLE	
OTHER	
COMMENTS	

VI - TYPE OF EQUIPMENT, check all that applies:

CRUSHERS	x	TRANSFER	x
SCREENS	x	STORAGE	x
CONVEYORS	x	LOAD OUT	x
OTHERS			
COMMENTS			

VII - MATERIAL TYPES check all that applies

ROCK	
SAND	
LIMESTONE	x
LAVA ROCK	
OTHER	

VIII - OPERATING SCHEDULE

HOURS per DAY	10
DAYS per WEEK	5
WEEK per YEAR	52
CAL. HRS per YR	2600
ACT. HRS per YR	2500

CAL. Hrs/Yr = Hr/Dy*Dy/Wk*Wk/Yr

IX - THROUGHPUT (tons per year)

ACTUAL ANNUAL	222,712	Tons/Yr.
HOURLY (average)	89	TPH
MAX. DESIGN RATE	250.0	TPH

Hourly (average) = Annual (actual) / Actual Hours per Year (operated)

X - MOISTURE CONTENT (%)

MOISTURE CONTENT ENTERING SYS.: 3 %

XI - TYPE OF OPERATION AND / OR DEVICE

CODE	NAME OF DEVICE OR SYSTEM	CODE	NAME OF DEVICE OR SYSTEM
0	No Device	11	Screening, Wet Washing (Note 4)
1	Dump to Hopper, truck, pile (Note 2)	12	Silo, Filling - Pneumatic
2	Grizzly (Note 2)	13	Silo, Filling - Bucket Elevator
3	Hopper (Note 2)	14	Silo, discharge to Conveyor (Note 2)
4	Transfer Point (Note 2)	15	Silo, discharge to Tank Truck
5	Conveyor (Note 2)	16	Loading Open Top Truck (Note 2)
6	Crushing, Dry - Primary	17	Feeder
7	Crushing, Dry - Secondary	18	See Lookup Table "EmFac" for data
8	Crushing, Dry - Tertiary	19	See Lookup Table "EmFac" for data
9	Crushing, Wet (Note 3)	20	See Lookup Table "EmFac" for data
10	Screening, Dry	21	See Lookup Table "EmFac" for data

XII - TYPE OF EMISSION CONTROL EQUIPMENT

CODE	TYPE OF CONTROL	CODE	TYPE OF CONTROL
0	None	11	Gravel Bed Filters
1	Water Spray, Point of Application	12	Spray Tower (Low Efficiency)
2	Spray with Additives, Point of Application	13	Wet Scrubber (Med Efficiency)
3	Conveyor with Half Cover	14	Venturi Scrubber (High Efficiency)
4	Conveyor with Three Quarter Cover	15	Baghouse with Multiple Pickups
5	Conveyor with Full Cover	16	Baghouse with Single Pickup (Unenclosed)
6	Process Enclosure	17	Baghouse with Single Pickup (Partial Enclosed)
7	Gravity Separator	18	Baghouse with Single Pickup (Full Enclosed)
8	Cyclone - Simple	19	Baghouse with Single Pickup (Attached)
9	Cyclone - Multiple	20	Electrostatic Precipitator
10	Windscreen, Windward Side	21	See Lookup Table "ConEff" for data

XIII - EMISSION CALCULATIONS

EQUIPMENT ID NUMBER (A)	DEVICE CODE NO (B)	NAME OF DEVICE (C)	MOTOR BHP (D)	THROUGHPUT TONS / YEAR (E)	EMISSION CONTROL DEVICE CODE (F)	DsF (G)	NAME OF DEVICE (H)	EFF % (I)	EMISSION FACTORS POUNDS PER TON PM_{30} (J)	PM_{10} (K)	$PM_{2.5}$ (L)	EMISSION RATE TONS PER YEAR PM_{30} (M)	PM_{10} (N)	$PM_{2.5}$ (O)
1	1	Dump to Hopper, truck, pile (Note 2)	NA	222,712	0		None	0.0	0.002	0.001	0.000	0.26	0.12	0.04
2	4	Transfer Point (Note 2)	NA	222,712	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.07	0.03	0.01
31-120	2	Grizzly (Note 2)	50	222,712	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.07	0.03	0.01
3	4	Transfer Point (Note 2)	NA	222,712	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.07	0.03	0.01
3.1	10	Screening, Dry	40	222,712	16		Baghouse with Single Pickup (Unencl	97.0	0.160	0.120	0.038	0.53	0.40	0.13
4	4	Transfer Point (Note 2)	NA	41,844	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.01	0.01	0.00
5	5	Conveyor (Note 2)	15	41,844	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.01	0.01	0.00
6	4	Transfer Point (Note 2)	NA	11,304	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.00	0.00	0.00
7	4	Transfer Point (Note 2)	NA	264	0		None	0.0	0.002	0.001	0.000	0.00	0.00	0.00
8	5	Conveyor (Note 2)	15	264	0		None	0.0	0.002	0.001	0.000	0.00	0.00	0.00
9	4	Transfer Point (Note 2)	NA	11,304	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.00	0.00	0.00
10	4	Transfer Point (Note 2)	NA	33,911	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.01	0.00	0.00
11	4	Transfer Point (Note 2)	NA	135,650	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.04	0.02	0.01
11.1	6	Crushing, Dry - Primary	200	135,650	1		Water Spray, Point of Application	75.0	0.280	0.017	0.005	4.75	0.29	0.08
12	4	Transfer Point (Note 2)	NA	135,650	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.04	0.02	0.01
13	5	Conveyor (Note 2)	25	180,867	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.05	0.03	0.01
14	5	Conveyor (Note 2)	20	180,867	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.05	0.03	0.01
15	5	Conveyor (Note 2)	25	180,867	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.05	0.03	0.01
16	5	Conveyor (Note 2)	25	180,867	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.05	0.03	0.01

TOTAL HORSEPOWER	415
AVERAGE THROUGHPUT PER DEVICE	125,511

BLOCK XIV - EMISSIONS & HARP INPUTS

EMISSION INVENTORY INPUTS

DEVICE DATA

PERMIT ID	B000751
NUMBER OF DEVICES	19
EQUIPMENT SIZE (bhp)	415

PROCESS DATA

PROCESS RATE (tpy)	222,712
MAX. DESIGN RATE (tph)	250
MAX. HOURLY PRODUCTION RATE (tph)	250
AVE. HOURLY PRODUCTION RATE (tph)	89

EMISSION DATA

ANNUAL EMISSIONS (tpy)	PM	PM_{10}	$PM_{2.5}$
UNCONTROLLED	39.192	15.643	4.925
CONTROLLED	6.075	1.064	0.330
EMISSION FACTOR (lb/ton)			
UNCONTROLLED	0.3520	0.1405	0.0442
CONTROLLED	0.0546	0.0096	0.0030
FRACTIONATION VALUE (PM10 or PM2.5 / PM)		0.1752	0.0543
OVERALL EFFICIENCY	84.50	93.20	93.31

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS STOCKPILES	FORM MINE S-PILES

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc — COMPANY NUMBER: 90

FACILITY NAME: Sentinel Quarry — FACILITY NUMBER: 461

Device ID# 90015

Name of / Number	Material Type	Stockpile Exposed Surface acres	Silt Loading %	Moisture (uncontrolled) %
Overburden	Limestone	2.0000	1.5	1.5
			30	0.5

Stockpile Name / Number	Dust Controls: Water Spray check	Water Spray gal/acre/day	Wind Screen check	Other check	Other Specify	Efficiency (%)
Overburden	X	800				
0						

EMISSIONS

Device ID# 90015 SCC 30502507

Emission Factors (pounds per acres)

EmFac = J *1.7 * s/1.5 * (365 - P)/235 * I/15 * 365

J = Aerodynamic factor

s = Silt Loading (%)

P = Day per year with at least 0.01 inches of precipitation

I = Percent of time with wind speed >12mph (%)

Aerodynamic factor	
TSP =	1.0
PM_{10} =	0.5
$PM_{2.5}$ =	0.2

Stockpile	Throughput (acres) Material Type	Size (acres)
Overburden	Limestone	2.0000
0	0	0.0000
	TOTAL	2
Number of Devices	1	

Emission Factor - Uncontrolled (pounds/acre) TSP	PM_{10}	$PM_{2.5}$
760.883	380.441	152.177
0.000	0.000	0.000
760.883	380.441	152.177

Fractionation Value PM_{10}	$PM_{2.5}$
0.500	0.200
0.000	0.000
0.500	0.200

Stockpile	Controls Type	Efficiency (%)	Emission Factor - Controlled (pounds/acre) TSP	PM_{10}	$PM_{2.5}$
Overburden	Water Spray	11.81	671.035	335.517	134.207
0	None	0.00	0.000	0.000	0.000
	TOTAL	11.81	671.035	335.517	134.207

	Emissions (tpy) = Area * EmFac TSP	PM_{10}	$PM_{2.5}$
	0.671	0.336	0.134
	0.000	0.000	0.000
TOTAL	0.671	0.336	0.134

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS EXHAUST FROM STATIONARY AND PORTABLE FUEL COMBUSTION	FORM MINE EX-S&P

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc — COMPANY NUMBER: 90

FACILITY NAME: Sentinel Quarry — FACILITY NUMBER: 461

DISTRICT PERMIT NO.	DEVICE ID	CODE (See Code below)	EQUIPMENT TYPE	FUEL TYPE	UNITS OF USAGE	UNITS USED PER YEAR
	543406	18	I. C. ENGINES	FUEL OIL #2 @ 0.05 % S	1000 GAL	1.1
	543407	18	I. C. ENGINES	FUEL OIL #2 @ 0.05 % S	1000 GAL	0.5
			#N/A	#N/A	#N/A	

CODE	EQUIPMENT TYPE	FUEL TYPE	SCC
1	BOILER > 100 MMBTU/HR	NATURAL GAS	1-02-006-01
2	BOILER 10 - 100 MMBTU/HR	NATURAL GAS	1-02-006-02
3	BOILER <10 MMBTU/HR	NATURAL GAS	1-02-006-03
4	BOILER, COGENERATION	NATURAL GAS	1-02-006-06
5	BOILER	FUEL OIL #2 @ 0.5 % S	1-02-005-01
6	BOILER	FUEL OIL #2 @ 0.05 % S	1-02-005-01
7	BOILER	PROPANE, LPG	1-02-010-02
8	SPACE HEATER	NATURAL GAS	1-05-001-06
9	SPACE HEATER	FUEL OIL #2 @ 0.5 % S	1-05-001-05
10	SPACE HEATER	FUEL OIL #2 @ 0.05 % S	1-05-001-05
11	SPACE HEATER	PROPANE, LPG	1-05-001-10
12	INDUSTRIAL PROCESS	NATURAL GAS	3-05-900-03
13	INDUSTRIAL PROCESS	FUEL OIL #2 @ 0.5 % S	3-05-900-01
14	INDUSTRIAL PROCESS	FUEL OIL #2 @ 0.05 % S	3-05-900-01
15	INDUSTRIAL PROCESS	PROPANE, LPG	3-05-900-99
16	I. C. ENGINES	NATURAL GAS	2-03-002-04
17	I. C. ENGINES	FUEL OIL #2 @ 0.5 % S	2-02-017-xx
18	I. C. ENGINES	FUEL OIL #2 @ 0.05 % S	2-02-017-xx
19	I. C. ENGINES	PROPANE, LPG	2-02-017-xx
20	I. C. ENGINES	GASOLINE	2-02-017-20
21	GAS TURBINES	NATURAL GAS	2-02-002-01
22	GAS TURBINES - COGEN.	NATURAL GAS	2-02-002-03
23	GAS TURBINE	FUEL OIL #2 @ 0.5 % S	2-02-001-01
24	GAS TURBINE	FUEL OIL #2 @ 0.05 % S	2-02-001-01
25	User defined, see Worksheet "SFB"	0	0
26	User defined, see Worksheet "SFB"	0	0
27	User defined, see Worksheet "SFB"	0	0
28	User defined, see Worksheet "SFB"	0	0
29	User defined, see Worksheet "SFB"	0	0
30	User defined, see Worksheet "SFB"	0	0

EMISSIONS

EXHAUST FROM STATIONARY EQUIPMENT

PERMIT NO. / CODE	DEVICE ID	EQUIPMENT TYPE / FUEL TYPE	PROCESS RATE UNITS PER YEAR / UNITS	SOURCES CLASSIFICATION CODE SCC /CAS #	ORGANIC GASES TOG 43101	FRAC ROG/VOC	CO 42101	NOx 42603	SOx 42401	PARTICULATE MATTER PM 11101	FRAC PM_{10} / $PM_{2.5}$
					EMISSIONS FACTORS (pounds per unit of usage) / ANNUAL EMISSIONS (tons per year)						
0	543406	I. C. ENGINES	1.1	2-02-017-xx	37.42	0.884	102	469	1.56	33.5	0.976
18		FUEL OIL #2 @ 0.05 % S	1000 GAL	Annual Emissions	0.021	0.018	0.056	0.258	0.001	0.018	0.018
0	543407	I. C. ENGINES	0.5	2-02-017-xx	37.42	0.884	102	469	1.56	33.5	0.976
18		FUEL OIL #2 @ 0.05 % S	1000 GAL	Annual Emissions	0.009	0.008	0.026	0.117	0.000	0.008	0.008

TOTAL EMISSIONS	TOG	ROG / VOC	CO	NOx	SOx	PM	PM_{10} / $PM_{2.5}$
Tons per Year	0.030	0.026	0.082	0.375	0.001	0.027	0.026

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS EXHAUST FROM MOBILE AND VEHICULAR EQUIPMENT	FORM MINE EX-M

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc
FACILITY NAME: Sentinel Quarry
COMPANY NUMBER: 90
FACILITY NUMBER: 461

DEVICE # **90001,2**

PROCESS NUMBER	CODE (See Code below)	EQUIPMENT TYPE	FUEL TYPE	UNITS OF USAGE	UNITS USED PER YEAR
1	1	HEAVY DUTY - OFF ROAD *	DIESEL	1000 hp-hr	670.0
2	8	Low emission Tier I	DIESEL	1000 hp-hr	718.0
20		#N/A	#N/A	#N/A	

CODE	EQUIPMENT TYPE	FUEL TYPE		SCC
1	HEAVY DUTY - OFF ROAD *	DIESEL	1000 hp-hr	3-05-025-99
2	HEAVY DUTY - OFF ROAD *	GASOLINE	1000 hp-hr	3-05-025-99
3	MISC - OFF ROAD **	NG / LPG	1000 hp-hr	3-05-025-99
4	LOCOMOTIVES	DIESEL	1000 GAL	3-05-025-99
5	LIGHT DUTY VEHICLES ***	GASOLINE	1000 VMT	3-05-025-99
6	HEAVY DUTY - ON ROAD ****	DIESEL	1000 VMT	3-05-025-99
7	Low Emission Retrofit-Loaders	DIESEL	1000 hp-hr	3-05-025-99
8	Low emission Tier I	DIESEL	1000 hp-hr	3-05-025-99
9	User defined, see Lookup Table	0	0	0
10	User defined, see Lookup Table	0	0	0
11	User defined, see Lookup Table	0	0	0
12	User defined, see Lookup Table	0	0	0
13	User defined, see Lookup Table	0	0	0
14	User defined, see Lookup Table	0	0	0
15	User defined, see Lookup Table	0	0	0

* OFF ROAD INCLUDES MINING AND EARTH MOVING EQUIPMENT
** MISC - OFF ROAD INCLUDES NG/LPG LOADER, FORKLIFTS, ETC.
*** LIGHT DUTY INCLUDES CARS, VAS, SMALL TRUCKS, ECT.
**** ON ROAD INCLUDES TRUCKS, ETC .

1000 hp-hr = THOUSAND OF HORSEPOWER HOURS
1000 GAL = THOUSAND OF GALLONS OF LIQUID FUEL
1000 VTM = THOUSAND VEHICLE MILES TRAVELED
MMCF = MILLION OF CUBIC FEET OF NATURAL GAS

EMISSIONS

DEVICE # 90001,2

PROCESS ID	CODE	EQUIPMENT TYPE	PROCESS RATE UNITS PER YEAR / UNITS	SOURCES CLASSIFICATION CODE SCC /CAS #	ORGANIC GASES TOG 43101	FRAC ROG / VOC	CO 42101	NOx 42603	SOx 42401	PARTICULATE MATTER PM 11101	FRAC PM_{10} / $PM_{2.5}$
					EMISSIONS FACTORS (pounds per unit of usage) / ANNUAL EMISSIONS (tons per year)						
1	1	HEAVY DUTY - OFF ROAD *	670.0	3-05-025-99	2.42	0.9676	7.50	24.25	2.91	1.54	0.994
			1000 hp-hr	Annual Emissions	0.811	0.784	2.513	8.124	0.975	0.516	0.513
2	7	Low Emission Retrofit-Loaders	718.0	3-05-025-99	2.42	0.9676	7.5	15.2	2.91	0.33	0.99
			1000 hp-hr	Annual Emissions	0.869	0.841	2.693	5.457	1.045	0.118	0.117

	TOG	ROG / VOC	CO	NOx	SOx	PM	PM_{10} / $PM_{2.5}$
TOTAL EMISSIONS	1.679	1.625	5.205	13.581	2.020	0.634	0.630

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS UNPAVED ROADS - ENTRAINED DUST	FORM MINE UPR

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc — COMPANY NUMBER: 90

FACILITY NAME: Sentinel Quarry — FACILITY NUMBER: 461

DEVICE # **90013**

Process Number	Vehicle type	Road Type * Ind / Pub	Vehicle Weigh (tons) Empty	Loaded	Mean	Distance Traveled per Year (vmt) Round Trip Miles	Trips per Day	Days per Year	Miles per Year	Mean Vehicle Sped (mph)	Silt Loading * %	Moisture %
1	T. Haul Ore to Crusher	Ind	70	150	110.0	0.9	10.8	260	2,527.2	25	8	1.5
2	T. Haul Ore to Plant	Ind	70	150	110.0	16	10.2	260	42,432.0	25	8.3	1.5
3	Haul Crush to Waste	Ind	70	150	110.0	0.25	0.6	260	39.0	25	10	1.5
4	T. Haul Quarry to Waste	Ind	43.31	123.31	83.3	1.15	11	260	3,289.0	25	10	1.5
5	Load Trucks	Ind	100	116	108.0	0.02	162	260	842.4	5	10	1.5
6	Drill Rig	Ind	36	36	36.0	0.02	18	260	93.6	5	10	1.5
12					0.0				0.0		11	0.2

* Road Type
Ind = Unpaved road surfaces a industrial sites
Pub = Publicly accessible roadways dominated by light duty vehicles

* For other Silt Loadings % is cells 'A167' through 'D178'.

Process Number	Vehicle Type	Road Type	Dust Control Method (Check "X" only one method per emission source (row) and complete appropriate cells below) Method Cells	None none	Water D52-D63 or E52-G63	Water with Suppressants H52 - M63	Surface Improvement D70 - E 81	Wind Screens or Wind Breaks G70 - H81	Other I70 - M81
1	T. Haul Ore to Crusher	Ind				x			
2	T. Haul Ore to Plant	Ind				x			
3	Haul Crush to Waste	Ind				x			
4	T. Haul Quarry to Waste	Ind				x			
5	Load Trucks	Ind			x				
6	Drill Rig	Ind			x				
12	0	0		X					

Process Number	Vehicle Type	Road Type	Dust Control Method — Water (Either new moisture content or application rate): New Surface Moisture Content (%)	Water Application Rate: Traffic Rate vehicles per hour	Hours between Application	Intensity of water gallons / sq yd of Roadway *	Water with Suppressant: Type or Name of Suppressant	Intensity of Suppressant Gallons / sq yd of Roadway *	Frequency of Application (Check (X) only one): Weekly Ever 7 days	Bi-Weekly Every 14 days	Monthly Every 30 - 31 days	Bi-Monthly Every 61 day
1	T. Haul Ore to Crusher	Ind		4.4	4		MgCI	0.15			x	
2	T. Haul Ore to Plant	Ind		3	4		MgCI	0.15			x	
3	Haul Crush to Waste	Ind		1.3	4		MgCI	0.15			x	
4	T. Haul Quarry to Waste	Ind			4		MgCI	0.15			x	
5	Load Trucks	Ind	3	58.7	4	0.2						
6	Drill Rig	Ind	1.5	3	4	0.1						
12	0	0										

(* 0.1 gallons of water or suppressant per square yard of road = 1760 gallons per mile of a 30 foot wide road.)

Process Number	Vehicle Type	Road Type	Dust Control Method — Surface Improvement New Silt Content (%): 3 Months after Application	6 Months after Application	Average	Wind Screens or Wind Breaks: Height (feet)	Width (feet)	Other: Name/Type	Description	Control Efficiency (%)
1	T. Haul Ore to Crusher	Ind			8				MgCI	75
2	T. Haul Ore to Plant	Ind			8.3				MgCI	75
3	Haul Crush to Waste	Ind			10				MgCI	75
4	T. Haul Quarry to Waste	Ind			10				MgCI	75
5	Load Trucks	Ind			10				Water Truck	50
6	Drill Rig	Ind			10				Water truck	50
12	0	0			11					

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS UNPAVED ROADS - ENTRAINED DUST	FORM MINE UPR

EMISSIONS

DEVICE # 90014

Emission Factor pounds per vehicle miles traveled

Industrial Roads

EmFac = k * (s / 12)^a * (W / 3)^b

Public Road

EmFac = k * ({[(s / 12)^a * (S / 30)^d] / (M / 0.5)^c} -C)*[(365 - P)/365]

k, a, b, c, & d = Constants - See Lookup Table entitled "Constants for Emission Factor Equations"

s = Silt content of unpaved surface in percent (%)

W = Average vehicle weight in tons

S = Mean vehicle speed (mph)

M = Moisture content of unpaved surface in percent (%)

P = Number of days per year with at least 0.01 inches of precipitation - see MetData worksheet Cell ' C16.

Process Number	Vehicle Type	Throughput Road Type	vmt	Emission Factors Uncontrolled (pounds / vmt) PM	PM_{10}	PM_{10}		Fractionation Value PM_{10}	PM_{10}
1	T. Haul Ore to Crusher	Ind	2,527.2	16.613	4.689	0.719		0.282	0.043
2	T. Haul Ore to Plant	Ind	42,432.0	17.047	4.847	0.743		0.284	0.044
3	Haul Crush to Waste	Ind	39.0	19.421	5.732	0.879		0.295	0.045
4	T. Haul Quarry to Wast	Ind	3,289.0	17.138	5.059	0.776		0.295	0.045
5	Load Trucks	Ind	842.4	19.262	5.685	0.872		0.295	0.045
6	Drill Rig	Ind	93.6	11.749	3.468	0.532		0.295	0.045
7	0	0	0.0	0.000	0.000	0.000		0.000	0.000
8	0	0	0.0	0.000	0.000	0.000		0.000	0.000
9	0	0	0.0	0.000	0.000	0.000		0.000	0.000
10	0	0	0.0	0.000	0.000	0.000		0.000	0.000
11	0	0	0.0	0.000	0.000	0.000		0.000	0.000
12	0	0	0.0	0.000	0.000	0.000		0.000	0.000
		TOTAL	49,223.2	17.060	4.866	0.746		0.285	0.044
	Number of Devices	6							

Process Number	Vehicle Type	Road Type	Efficiency percentage (%) of Dust Control Methods None	Water New Surface Moisture Content (%)	Water Application Rate *	Water with Suppressants	Surface Improvement	Wind Screens or Wind Breaks	Other	Overall
1	T. Haul Ore to Crusher	Ind	0.00	0.00	0.00	75.00	0.00	0.00	75.00	75.00
2	T. Haul Ore to Plant	Ind	0.00	0.00	0.00	75.00	0.00	0.00	75.00	75.00
3	Haul Crush to Waste	Ind	0.00	0.00	0.00	75.00	0.00	0.00	75.00	75.00
4	T. Haul Quarry to Waste	Ind	0.00	0.00	0.00	75.00	0.00	0.00	75.00	75.00
5	Load Trucks	Ind	0.00	75.00	-5.66	E	0.00	0.00	50.00	75.00
6	Drill Rig	Ind	0.00	0.00	89.20	E	0.00	0.00	50.00	89.20
7	0	0	0.00	0.00	0.00	E	0.00	0.00	0.00	0.00
8	0	0	0.00	0.00	0.00	E	0.00	0.00	0.00	0.00
9	0	0	0.00	0.00	0.00	E	0.00	0.00	0.00	0.00
10	0	0	0.00	0.00	0.00	E	0.00	0.00	0.00	0.00
11	0	0	0.00	0.00	0.00	E	0.00	0.00	0.00	0.00
12	0	0	0.00	0.00	0.00	E	0.00	0.00	0.00	0.00

* Dust Controls - Water Application Rate

C = 100 - (0.0012 * A * D * T) / I

C = Control efficiency (%)

A = pan evaporation rate (inches)

D = Vehicles per hour

T = Hours between watering

I = Gallons / sq. yd (Note 0.1 gallon/sq yd = 1760 gallons per mile for a 30 foot wide road.)

Process Number	Vehicle Type	Road Type	Efficiency (%)	Emission Factor - Controlled (pounds/vmt) PM	PM_{10}	$PM_{2.5}$		Emissions (tpy) PM	PM_{10}	$PM_{2.5}$
1	T. Haul Ore to Crusher	Ind	75.00	4.153	1.172	0.180		5.248	1.481	0.227
2	T. Haul Ore to Plant	Ind	75.00	4.262	1.212	0.186		90.415	25.711	3.942
3	Haul Crush to Waste	Ind	75.00	4.855	1.433	0.220		0.095	0.028	0.004
4	T. Haul Quarry to Wast	Ind	75.00	4.285	1.265	0.194		7.046	2.080	0.319
5	Load Trucks	Ind	75.00	4.815	1.421	0.218		2.028	0.599	0.092
6	Drill Rig	Ind	89.20	1.269	0.375	0.057		0.059	0.018	0.003
7	0	0	0.00	0.000	0.000	0.000		0.000	0.000	0.000
8	0	0	0.00	0.000	0.000	0.000		0.000	0.000	0.000
9	0	0	0.00	0.000	0.000	0.000		0.000	0.000	0.000
10	0	0	0.00	0.000	0.000	0.000		0.000	0.000	0.000
11	0	0	0.00	0.000	0.000	0.000		0.000	0.000	0.000
12	0	0	0.00	0.000	0.000	0.000		0.000	0.000	0.000
		TOTAL	75.03	4.262	1.216	0.186	TOTAL	104.891	29.916	4.587

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROADS	FORM MINE ERO

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc — COMPANY NUMBER: 90

FACILITY NAME: Sentinel Quarry — FACILITY NUMBER: 461

DEVICE # **90014**

Process Number	Parking Areas acres	Disturbed Areas acres	Vegetative cover fraction	Moisture Natural %	Threshold Friction Velocity Area Use Code *	Threshold Friction Velocity Usage Name	Ratio of Wind Speed to Friction Velocity Area Use Code **	Ratio of Wind Speed to Friction Velocity Usage Name
1		1.9		0.5	3	Construction Site	3	Moderate Industrial / Mining
2		7		0.5	3	Construction Site	3	Moderate Industrial / Mining
10				0.5		None		None

* Threshold Friction Velocity Code	Area Usage
0	None
1	Mine Tailings
2	Abandoned Agricultural Land
3	Construction Site
4	Disturbed Desert
5	Scrub Desert
6	Coal Dust
7	Active Agricultural Land
8	Coal Pile
9	User Defined
10	User Defined
11	User Defined
12	User Defined

** Ration of Wind Speed to Friction Velocity Code	Area Usage
0	None
1	Open Space
2	Light Industrial / Mining
3	Moderate Industrial / Mining
4	Heavy Industrial / Mining
5	User Defined
6	User Defined
7	User Defined
8	User Defined
9	User Defined
10	User Defined

Process Number	Total Parking and Disturbed Areas	Dust Controls (Check 'x' only one method) None check (x)	Water Spray check (x)	Water Spray Water Added gallons per acre per day	New Surface Moisture Content (%) Calculated from Added Water	New Surface Moisture Content (%) As Measured (%)	New Surface Moisture Content (%) Moisture Content for Calculation	Wind Screen check (x)	Other check (x)	Other Specify	Other Efficiency (%)
1	1.9				-0.32		0.00		X	MgCl	75
2	7		x	500	4.28		4.28				
10	0	x			-0.32		0.00				

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROADS	FORM MINE ERO

EMISSIONS

DEVICE # **90014**

Emission Factor - pounds per acre

EmFac = 2.814 * k *(1 - v) * (u / u_t)^3 * C(x)*2000

k = Aerodynamic Factor for Particulate Size
v = Amount of Vegetative cover as a Fraction
u = Mean Wind Speed in Meters per Second (m/s)
u_t = Threshold Value of Wind Speed (m/s)
C(x) = Correction Factor

Aerodynamic Factor
TSP = 1.0
PM_{10} = 0.5
$PM_{2.5}$ = 0.2

x = u_t/u

Threshold Value of Wind Speed - u_t

$u_t = u^*_t * u^*$

Process Number	Throughput: Parking Areas (Acres)	Throughput: Disturbed Area (Acres)	Threshold Friction Velocity u^*_t m/s	Ratio u*	Threshold Wind Speed u_t m/s	x	Correction Factor C(x)	Emission Factors TSP pounds/acre	PM_{10} pounds/acre	$PM_{2.5}$ pounds/acre
1	0	1.9	0.26	6.5	1.69	0.44	1.90	90,332.145	45,166.072	18,066.429
2	0	7	0.26	6.5	1.69	0.44	1.90	90,332.145	45,166.072	18,066.429
10	0	0	0	0	0	0.00	0.00	0.000	0.000	0.000
	INPUTS	8.9						90,332.145	45,166.072	18,066.429
	Number of Devices	0								

Process Number	Total Parking and Disturbed Areas Acres	Fractionation Value PM_{10}	$PM_{2.5}$
1	1.9	0.5	0.2
2	7	0.5	0.2
10	0	0	0
	INPUTS	0.5	0.2

Process Number	Total Parking and Disturbed Areas Acres	Controls Type	Efficiency (%)	Emission Factor - Controlled (pounds/acre) TSP	PM_{10}	$PM_{2.5}$
1	1.9	MgCl	75.0	22,583.036	11,291.518	4,516.607
2	7	Water Spray	95.0	4,516.607	2,258.304	903.321
10	0	None	0.0	0.000	0.000	0.000
		INPUTS	90.73	8,373.485	4,186.743	1,674.697

	Emissions (tpy) = Area * EmFac TSP	PM_{10}	$PM_{2.5}$
	21.454	10.727	4.291
	15.808	7.904	3.162
	0.000	0.000	0.000
TOTAL	37.262	18.631	7.452

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS TOTAL EMISSIONS	FORM MINE TOTAL

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc
FACILITY NAME: White Knob Quarry

COMPANY NUMBER: 90
FACILITY NUMBER: 461

TOTAL

EMISSION SOURCE / OPERATION / ACTIVITY	DEVICE ID #	CRITERIA EMISSIONS (tons per year)							
		TSP	PM_{10}	$PM_{2.5}$	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	90010	0.122	0.097	0.097					
BLASTING	90011	2.836	1.475	0.085					
EXPLOSIVES	90011				1.943	0.493	0.000		
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	90012a	11.006	5.354	1.636					
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	90006,7,8,9	0.868	0.422	0.129					
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	2456	6.204	2.009	0.631					
STOCKPILES - WIND EROSION	90015	0.178	0.089	0.036					
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	VARIOUS	0.317	0.309	0.309	0.964	4.432	0.354	0.313	0.015
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	90001,2	0.860	0.855	0.855	4.190	13.986	1.355	1.311	1.720
UNPAVED ROADS - ENTRAINED DUST	90013	63.121	17.990	2.758					
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROADS	90014a	68.088	34.044	13.618					
	GRAND TOTAL	153.600	62.644	20.154	7.097	18.911	1.708	1.623	1.735

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS FACILITY INFORMATION	FORM MINE FAC

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc
FACILITY NAME: White Knob Quarry
FACILITY LOCATION (address): 7225 Crystal Creek Road
CITY: Lucerne Valley
STATE: CA   ZIP: 92356

COMPANY NUMBER: 90
FACILITY NUMBER: 461
FACID: 9000461

MAILING ADDRESS: P.O. Box 825
CITY: Lucerne Valley
STATE: CA   ZIP: 92356

CONTACT PERSON: Christine Granquist
TELEPHONE NUMBER: 760-248-5223   EXT:
FAX NUMBER: 760-248-9115
EMAIL: christine.granquist@omya.com

MINE TYPE AND PARAMETERS

TYPE OF MINE	Quarry	(Quarry, Surface, Pit, Bank Run, Shaft, Etc.)
TYPE OF MATERIAL MINED	Limestone	(Limestone, Talc, Salts, Sand, Gravel, Rock, Volcanic Cinders, Gold, Silver, Iron Ore, Rear Earth, Etc.)
OVERBURDEN RATIO	0.66:1	Tons of Overburden per Ton of Ore

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS MINERALS HANDLED - AMOUNT & CHARACTERISTICS	FORM MINE MIN

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc
COMPANY NUMBER: 90
FACILITY NAME: White Knob Quarry
FACILITY NUMBER: 461

Name of Minerals	Amounts (tpy) Shifted by Blasting	Total Handled	Characteristics Moisture (%)	Silt (%)
Limestone	243,036	243,036	0.5	5.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
			0.5	30.0
TOTAL	243,036	243,036		

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS METEOROLOGICAL DATA	FORM MINE MET-D

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc

FACILITY NAME: White Knob Quarry

COMPANY NUMBER: 90

FACILITY NUMBER: 461

Parameter	Value	Description	Default Value
Mean Wind Speed	7.7	mph	7.7
u	3.4	meters per second	
Precipitation	20.0	Day per year with at least 0.01 inches of precipitation	20.0
Wind Speed	13.3	Percent of time with wind speed >12mph (%)	13.3
Evaporation	75.0	Annual Pan Evaporation Rate in inches	75.0

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS DRILLING AND BLASTING	FORM MINE D&B

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc
FACILITY NAME: White Knob Quarry
COMPANY NUMBER: 90
FACILITY NUMBER: 461

Device ID# 90010 DRILLING
Device ID# 90011 BLASTING

Blast per year	22	number
Holes per Blast - Average	21	number
Holes drilled per year	462	Number of holes per year
Area Shifted per Blast - Average	6,431	square foot per blast - average
Area Shifted per Year	141,482	square foot per year
Amount shifted by blasting	243,036	Tons Ore, Waste & Overburden

EMISSIONS

DRILLING

Device ID# 90010

SCC 30502514

By Amount Shifted

Annual Throughput 243,036 Tons Shifted

Emission Factors (pounds per tons shifted)			Fractionation Value	
TSP	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
0.001	0.0008	0.0008	0.800	0.800

Controls
None, assumed wet drilling

Emissions - tons per year		
TSP	PM_{10}	$PM_{2.5}$
0.122	0.097	0.097

SCC 30502514

By Number of Holes Drilled

Annual Throughput 462 Holes Drilled

Emission Factors (pounds per hole drilled)			Fractionation Value	
TSP	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
1.3	0.68	0.68	0.523	0.523

Controls
None, assumed wet drilling

Emissions - tons per year		
TSP	PM_{10}	$PM_{2.5}$
0.300	0.157	0.157

BLASTING

Device ID# 90011

By Tons Shifted

Annual Throughput 243,036 Tons Shifted
SCC 30502514

Emission Factors (pounds per ton shifted)			Fractionation Value	
TSP	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
0.160	0.080	0.005	0.500	0.030

Controls
None

Emissions - tons per year Em = EmFac * Amount Shift		
TSP	PM_{10}	$PM_{2.5}$
19.44288	9.72144	0.5832864

By Square Foot Shifted

Area Shifted per Blast - Average 6,431 square foot per blast - average
Area Shifted per Year 141,482 square foot per year
SCC 30502514

Emission Factors (pounds per blast) *			Fractionation Value	
TSP	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
257.862	134.088	7.736	0.520	0.030

* $EmFac = k * 0.0005 * A^{1.5}$ 35.71428571

k = Aerodynamic Factor
TSP = 1.00
PM_{10} = 0.52
$PM_{2.5}$ = 0.03
A = Area Shifted per Blast - Average

Controls
None

Emissions - tons per year Em = EmFac * Blast per Year		
TSP	PM_{10}	$PM_{2.5}$
2.836	1.475	0.085

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS EXPLOSIVES	FORM MINE EXPL

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc
FACILITY NAME: White Knob Quarry
COMPANY NUMBER: 90
FACILITY NUMBER: 461

Device ID# 90011

Code * See Codes below	Type	Composition	Amount tons/ year
6	ANFO	Ammonium Nitrate, Fuel Oil	58
	None	None	

* Codes for Explosive	
Code	Explosive
0	None
1	Black Powder
2	Smokeless Powder
3	Dynamite, Straight
4	Dynamite, Ammonia
5	Dynamite, Gelatin
6	ANFO
7	TNT
8	RDX
9	PETN
10	User Defined
11	User Defined
12	User Defined

EMISSIONS

Device ID# 90011 SCC 30502514

Explosive			Emission Factor pounds per ton			Emission Rate ton per year		
Code	Type	Amount tons/ year	CO	NOx	TOG	CO	NOx	TOG
6	ANFO	58.000	67	17	0	1.943	0.493	0.000
0	None	0.000	0	0	0	0.000	0.000	0.000
0	None	0.000	0	0	0	0.000	0.000	0.000
0	None	0.000	0	0	0	0.000	0.000	0.000
0	None	0.000	0	0	0	0.000	0.000	0.000
0	None	0.000	0	0	0	0.000	0.000	0.000
0	None	0.000	0	0	0	0.000	0.000	0.000
	INPUTS	58.000	67.000	17.000	0.000			
	Number of Devices	1						
					INPUTS	1.943	0.493	0.000

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS BULLDOZING, SCRAPING AND GRADING OF MATERIAL	FORM MINE BSG

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc
FACILITY NAME: White Knob Quarry
COMPANY NUMBER: 90
FACILITY NUMBER: 461

Device ID# 90012a

Name of Material	Hours of Operations (hours per year)					Controls			
	Bulldozing	Scraping	Grading	Other	Total	None Check	Water Spray Check	New Moisture (%)	Wind Screen Check
Limestone	101			863	964		X	1	
0					0				

EMISSIONS

Device ID# 90012a

SCC 30502599

Emission Factors (pounds per hours of operations)

EmFac = 2.76 * k *(s)^1.5 / (M)^1.4

k = Aerodynamic Factor
s = silt content (%)
M = Moisture content (%)

Aerodynamic factors
TSP = 0.74
PM_{10} = 0.36
$PM_{2.5}$ = 0.11

Material	Hours of Operations	Emission factors - Uncontrolled (pounds per hour)		
		TSP	PM_{10}	$PM_{2.5}$
Limestone	964	60.261	29.316	8.958
0	0	0.000	0.000	0.000
TOTAL	964	60.261	29.316	8.958
Number of Devices	1			

Fractionation Value	
PM_{10}	$PM_{2.5}$
0.486	0.149
0.000	0.000
0.486	0.149

Material	Control		Emission factors - Controlled (pounds per hour)		
	Type	Efficiency (%)	TSP	PM_{10}	$PM_{2.5}$
Limestone	Water Spray	62.107	22.835	11.109	3.394
0	None	0.000	0.000	0.000	0.000
	TOTAL	62.11	22.835	11.109	3.394

	Emissions - tons per year		
	TSP	PM_{10}	$PM_{2.5}$
	11.006	5.354	1.636
	0.000	0.000	0.000
TOTAL	11.006	5.354	1.636

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS LOADING OF MATERIAL(S) AT MINE / QUARRY / PIT	FORM MINE LOAD

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc — COMPANY NUMBER: 90

FACILITY NAME: White Knob Quarry — FACILITY NUMBER: 461

DEVICE # 90006,7,8,9

Name of Material	Amount Loaded tpy
Limestone	451,252
0	

Controls						
None	Water Spray		Wind Screen	Other		
Check	Check	New Moisture (%)	Check	Check	Specify	Efficiency (%)
	x	1				

EMISSIONS

Device ID# 90006,7,8,9 SCC 30502506

Emission Factors (pounds per ton)

EmFac =0.0032 * k *(U/5)^1.3 / (M/2)^1.4

k = Aerodynamic Factor

U = Mean wind speed in miles per hour

M = Moisture content (%)

Aerodynamic factors

TSP = 0.74

PM_{10} = 0.36

$PM_{2.5}$ = 0.11

Material	Amount Loaded tpy
Limestone	451,252
0	0
TOTAL	451,252
Number of Devices	1

Emission factors - Uncontrolled (pounds per ton)		
TSP	PM_{10}	$PM_{2.5}$
0.010	0.005	0.002
0.000	0.000	0.000
0.010	0.005	0.002

Fractionation Value	
PM_{10}	$PM_{2.5}$
0.486	0.149
0.000	0.000
0.486	0.149

Material	Control		Emission factors - Controlled (pounds per ton)		
	Type	Efficiency (%)	TSP	PM_{10}	$PM_{2.5}$
Limestone	Water Spray	62.107	0.004	0.002	0.001
0	None	0.000	0.000	0.000	0.000
	TOTAL	62.11	0.004	0.002	0.001

	Emissions - tons per year		
	TSP	PM_{10}	$PM_{2.5}$
	0.868	0.422	0.129
	0.000	0.000	0.000
TOTAL	0.868	0.422	0.129

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS AGGREGATE HANDLING, CRUSHING & SCREENING #1	FORM MINE AGG-1

I - COLOR CODE

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

II - MANDATORY INFORMATION

FLOW DIAGRAM
BLOCK III - ALL ITEMS
BLOCK VIII - ACTUAL HOURS OPERATED
BLOCK IX - ANNUAL THROUGHPUT (tpy)
BLOCK X - MOISTURE CONTENT (%) OF MATERIAL ENTERING THE SYSTEM
BLOCK XIII, COLUMNS 'B', 'E', 'F & 'G'

III - FACILITY INFORMATION

COMPANY NAME	Omya California Inc	COMPANY #	90	PERMIT #	B 0 0 2 4 5 6
FACILITY NAME	White Knob Quarry	FACILITY #	461	DEVICE ID	2456
PROCESS NAME	Crushing $ Screening Circuit	INVENTORY ID #	9000461	PROCESS ID	

IV - MAP COORDINATES FOR PROCESS

UTM ZONE 11 UTM EAST (km) 5 0 5 . 3 1 6 UTM NORTH (km) 3 8 0 4 . 4 1 5
LATITUDE (deg.) 3 4 . 3 8 3 7 LONGITUDE (deg.) 1 1 6 . 9 4 2 2

V - TYPE OF PLANT

STATIONARY	x
PORTABLE	
OTHER	
COMMENTS	

VI - TYPE OF EQUIPMENT, check all that applies:

CRUSHERS	x	TRANSFER	x
SCREENS	x	STORAGE	x
CONVEYORS	x	LOAD OUT	x
OTHERS			
COMMENTS			

VII - MATERIAL TYPES check all that applies

ROCK	
SAND	
LIMESTONE	x
LAVA ROCK	
OTHER	

VIII - OPERATING SCHEDULE

HOURS per DAY	10
DAYS per WEEK	5
WEEK per YEAR	52
CAL. HRS per YR	2600
ACT. HRS per YR	2500

CAL. Hrs/Yr = Hr/Dy*Dy/Wk*Wk/Yr

IX - THROUGHPUT (tons per year)

ACTUAL ANNUAL	208,216	Tons/Yr.
HOURLY (average)	83	TPH
MAX. DESIGN RATE	250.0	TPH

Hourly (average) = Annual (actual) / Actual Hours per Year (operated)

X - MOISTURE CONTENT (%)

MOISTURE CONTENT ENTERING SYS.: 3 %

XI - TYPE OF OPERATION AND / OR DEVICE

CODE	NAME OF DEVICE OR SYSTEM	CODE	NAME OF DEVICE OR SYSTEM
0	No Device	11	Screening, Wet Washing (Note 4)
1	Dump to Hopper, truck, pile (Note 2)	12	Silo, Filling - Pneumatic
2	Grizzly (Note 2)	13	Silo, Filling - Bucket Elevator
3	Hopper (Note 2)	14	Silo, discharge to Conveyor (Note 2)
4	Transfer Point (Note 2)	15	Silo, discharge to Tank Truck
5	Conveyor (Note 2)	16	Loading Open Top Truck (Note 2)
6	Crushing, Dry - Primary	17	Feeder
7	Crushing, Dry - Secondary	18	See Lookup Table "EmFac" for data
8	Crushing, Dry - Tertiary	19	See Lookup Table "EmFac" for data
9	Crushing, Wet (Note 3)	20	See Lookup Table "EmFac" for data
10	Screening, Dry	21	See Lookup Table "EmFac" for data

XII - TYPE OF EMISSION CONTROL EQUIPMENT

CODE	TYPE OF CONTROL	CODE	TYPE OF CONTROL
0	None	11	Gravel Bed Filters
1	Water Spray, Point of Application	12	Spray Tower (Low Efficiency)
2	Spray with Additives, Point of Application	13	Wet Scrubber (Med Efficiency)
3	Conveyor with Half Cover	14	Venturi Scrubber (High Efficiency)
4	Conveyor with Three Quarter Cover	15	Baghouse with Multiple Pickups
5	Conveyor with Full Cover	16	Baghouse with Single Pickup (Unenclosed)
6	Process Enclosure	17	Baghouse with Single Pickup (Partial Enclosed)
7	Gravity Separator	18	Baghouse with Single Pickup (Full Enclosed)
8	Cyclone - Simple	19	Baghouse with Single Pickup (Attached)
9	Cyclone - Multiple	20	Electrostatic Precipitator
10	Windscreen, Windward Side	21	See Lookup Table "ConEff" for data

XIII - EMISSION CALCULATIONS

EQUIPMENT ID NUMBER (A)	DEVICE CODE NO (B)	NAME OF DEVICE (C)	MOTOR BHP (D)	THROUGHPUT TONS / YEAR (E)	EMISSION CONTROL DEVICE CODE (F)	DsF (G)	NAME OF DEVICE (H)	EFF % (I)	EMISSION FACTORS POUNDS PER TON PM_{30} (J)	PM_{10} (K)	$PM_{2.5}$ (L)	EMISSION RATE TONS PER YEAR PM_{30} (M)	PM_{10} (N)	$PM_{2.5}$ (O)
32	1	Dump to Hopper, truck, pile (Note 2)	NA	208,216	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.06	0.03	0.01
33	2	Grizzly (Note 2)	50	208,216	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.06	0.03	0.01
34	5	Conveyor (Note 2)	15	104,108	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.03	0.01	0.00
35	5	Conveyor (Note 2)	10	104,108	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.03	0.01	0.00
36	4	Transfer Point (Note 2)	NA	104,108	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.03	0.01	0.00
36.1	10	Screening, Dry	50	104,108	1		Water Spray, Point of Application	75.0	0.160	0.120	0.038	2.08	1.56	0.49
37	5	Conveyor (Note 2)	7.5	72,876	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.02	0.01	0.00
38	5	Conveyor (Note 2)	25	72,876	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.02	0.01	0.00
39	4	Transfer Point (Note 2)	NA	72,876	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.02	0.01	0.00
40	4	Transfer Point (Note 2)	NA	31,190	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.01	0.00	0.00
41	4	Transfer Point (Note 2)	NA	104,108	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.03	0.01	0.00
41.1	6	Crushing, Dry - Primary	250	104,108	1		Water Spray, Point of Application	75.0	0.280	0.017	0.005	3.64	0.22	0.07
42	5	Conveyor (Note 2)	25	135,319	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.04	0.02	0.01
43	4	Transfer Point (Note 2)	NA	135,319	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.04	0.02	0.01
44	5	Conveyor (Note 2)	50	135,319	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.04	0.02	0.01
45	4	Transfer Point (Note 2)	NA	135,319	1		Water Spray, Point of Application	75.0	0.002	0.001	0.000	0.04	0.02	0.01
		TOTAL HORSEPOWER	482.5											
		AVERAGE THROUGHPUT PER DEVICE		114,511										

BLOCK XIV - EMISSIONS & HARP INPUTS

EMISSION INVENTORY INPUTS

DEVICE DATA

PERMIT ID	B002456
NUMBER OF DEVICES	16
EQUIPMENT SIZE (bhp)	482.5

PROCESS DATA

PROCESS RATE (tpy)	208,216
MAX. DESIGN RATE (tph)	250
MAX. HOURLY PRODUCTION RATE (tph)	250
AVE. HOURLY PRODUCTION RATE (tph)	83

EMISSION DATA

ANNUAL EMISSIONS (tpy)	PM	PM_{10}	$PM_{2.5}$
UNCONTROLLED	24.814	8.035	2.522
CONTROLLED	6.204	2.009	0.631
EMISSION FACTOR (lb/ton)			
UNCONTROLLED	0.2384	0.0772	0.0242
CONTROLLED	0.0596	0.0193	0.0061
FRACTIONATION VALUE (PM10 or PM2.5 / PM)		0.3238	0.1016
OVERALL EFFICIENCY	75.00	75.00	75.00

EMISSION YEAR 200 **8**	HARP / CEIDARS MINING OPERATIONS STOCKPILES	FORM MINE S-PILES

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc — COMPANY NUMBER: 90

FACILITY NAME: White Knob Quarry — FACILITY NUMBER: 461

Device ID# 90015A

Name of / Number	Material Type	Stockpile Exposed Surface acres	Silt Loading %	Moisture (uncontrolled) %
Overburden	Limestone	0.5000	1.5	1.5
			30	0.5

Stockpile Name / Number	Dust Controls: Water Spray check	Water Spray gal/acre/day	Wind Screen check	Other check	Other Specify	Other Efficiency (%)
Overburden	X	800				
0						

EMISSIONS

Device ID# 90015 SCC 30502507

Emission Factors (pounds per acres)

EmFac = J *1.7 * s/1.5 * (365 - P)/235 * I/15 * 365

J = Aerodynamic factor

s = Silt Loading (%)

P = Day per year with at least 0.01 inches of precipitation

I = Percent of time with wind speed >12mph (%)

Aerodynamic factor	
TSP =	1.0
PM_{10} =	0.5
$PM_{2.5}$ =	0.2

Stockpile	Throughput (acres): Material Type	Size (acres)
Overburden	Limestone	0.5000
0	0	0.0000
	TOTAL	0.5
Number of Devices	1	

Emission Factor - Uncontrolled (pounds/acre): TSP	PM_{10}	$PM_{2.5}$
807.706	403.853	161.541
0.000	0.000	0.000
807.706	403.853	161.541

Fractionation Value: PM_{10}	$PM_{2.5}$
0.500	0.200
0.000	0.000
0.500	0.200

Stockpile	Controls: Type	Efficiency (%)	Emission Factor - Controlled (pounds/acre): TSP	PM_{10}	$PM_{2.5}$
Overburden	Water Spray	11.81	712.329	356.165	142.466
0	None	0.00	0.000	0.000	0.000
	TOTAL	11.81	712.329	356.165	142.466

	Emissions (tpy) = Area * EmFac: TSP	PM_{10}	$PM_{2.5}$
	0.178	0.089	0.036
	0.000	0.000	0.000
TOTAL	0.178	0.089	0.036

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS EXHAUST FROM STATIONARY AND PORTABLE FUEL COMBUSTION	FORM MINE EX-S&P

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc
FACILITY NAME: White Knob Quarry
COMPANY NUMBER: 90
FACILITY NUMBER: 461

DISTRICT PERMIT NO.	DEVICE ID	CODE (See Code below)	EQUIPMENT TYPE	FUEL TYPE	UNITS OF USAGE	UNITS USED PER YEAR
b003294	23294	18	I. C. ENGINES	FUEL OIL #2 @ 0.05 % S	1000 GAL	18.9
			#N/A	#N/A	#N/A	

CODE	EQUIPMENT TYPE	FUEL TYPE	SCC
1	BOILER > 100 MMBTU/HR	NATURAL GAS	1-02-006-01
2	BOILER 10 - 100 MMBTU/HR	NATURAL GAS	1-02-006-02
3	BOILER <10 MMBTU/HR	NATURAL GAS	1-02-006-03
4	BOILER, COGENERATION	NATURAL GAS	1-02-006-06
5	BOILER	FUEL OIL #2 @ 0.5 % S	1-02-005-01
6	BOILER	FUEL OIL #2 @ 0.05 % S	1-02-005-01
7	BOILER	PROPANE, LPG	1-02-010-02
8	SPACE HEATER	NATURAL GAS	1-05-001-06
9	SPACE HEATER	FUEL OIL #2 @ 0.5 % S	1-05-001-05
10	SPACE HEATER	FUEL OIL #2 @ 0.05 % S	1-05-001-05
11	SPACE HEATER	PROPANE, LPG	1-05-001-10
12	INDUSTRIAL PROCESS	NATURAL GAS	3-05-900-03
13	INDUSTRIAL PROCESS	FUEL OIL #2 @ 0.5 % S	3-05-900-01
14	INDUSTRIAL PROCESS	FUEL OIL #2 @ 0.05 % S	3-05-900-01
15	INDUSTRIAL PROCESS	PROPANE, LPG	3-05-900-99
16	I. C. ENGINES	NATURAL GAS	2-03-002-04
17	I. C. ENGINES	FUEL OIL #2 @ 0.5 % S	2-02-017-xx
18	I. C. ENGINES	FUEL OIL #2 @ 0.05 % S	2-02-017-xx
19	I. C. ENGINES	PROPANE, LPG	2-02-017-xx
20	I. C. ENGINES	GASOLINE	2-02-017-20
21	GAS TURBINES	NATURAL GAS	2-02-002-01
22	GAS TURBINES - COGEN.	NATURAL GAS	2-02-002-03
23	GAS TURBINE	FUEL OIL #2 @ 0.5 % S	2-02-001-01
24	GAS TURBINE	FUEL OIL #2 @ 0.05 % S	2-02-001-01
25	User defined, see Worksheet "SFB"	0	0
26	User defined, see Worksheet "SFB"	0	0
27	User defined, see Worksheet "SFB"	0	0
28	User defined, see Worksheet "SFB"	0	0
29	User defined, see Worksheet "SFB"	0	0
30	User defined, see Worksheet "SFB"	0	0

EMISSIONS

EXHAUST FROM STATIONARY EQUIPMENT

PERMIT NO. / CODE	DEVICE ID	EQUIPMENT TYPE / FUEL TYPE	PROCESS RATE UNITS PER YEAR / UNITS	SOURCES CLASSIFICATION CODE SCC /CAS #	ORGANIC GASES TOG 43101	FRAC ROG/VOC	CO 42101	NOx 42603	SOx 42401	PARTICULATE MATTER PM 11101	FRAC PM_{10} / $PM_{2.5}$
					EMISSIONS FACTORS (pounds per unit of usage) / ANNUAL EMISSIONS (tons per year)						
b003294	23294	I. C. ENGINES	18.9	2-02-017-xx	37.42	0.884	102	469	1.56	33.5	0.976
18		FUEL OIL #2 @ 0.05 % S	1000 GAL	Annual Emissions	0.354	0.313	0.964	4.432	0.015	0.317	0.309

TOTAL EMISSIONS	TOG	ROG / VOC	CO	NOx	SOx	PM	PM_{10} / $PM_{2.5}$
Tons per Year	0.354	0.313	0.964	4.432	0.015	0.317	0.309

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS EXHAUST FROM MOBILE AND VEHICULAR EQUIPMENT	FORM MINE EX-M

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc
FACILITY NAME: White Knob Quarry
COMPANY NUMBER: 90
FACILITY NUMBER: 461

DEVICE # **90001,2**

PROCESS NUMBER	CODE (See Code below)	EQUIPMENT TYPE	FUEL TYPE	UNITS OF USAGE	UNITS USED PER YEAR
1	1	HEAVY DUTY - OFF ROAD *	DIESEL	1000 hp-hr	1,105.0
2	7	Low emission Tier I	DIESEL	1000 hp-hr	77.3
3	5	LIGHT DUTY VEHICLES ***	GASOLINE	1000 VMT	0.42
20		#N/A	#N/A	#N/A	

CODE	EQUIPMENT TYPE	FUEL TYPE		SCC
1	HEAVY DUTY - OFF ROAD *	DIESEL	1000 hp-hr	3-05-025-99
2	HEAVY DUTY - OFF ROAD *	GASOLINE	1000 hp-hr	3-05-025-99
3	MISC - OFF ROAD **	NG / LPG	1000 hp-hr	3-05-025-99
4	LOCOMOTIVES	DIESEL	1000 GAL	3-05-025-99
5	LIGHT DUTY VEHICLES ***	GASOLINE	1000 VMT	3-05-025-99
6	HEAVY DUTY - ON ROAD ****	DIESEL	1000 VMT	3-05-025-99
7	Low emission Tier I	DIESEL	1000 hp-hr	3-05-025-99
8	Low Emission Retrofit-Loaders	DIESEL	1001 hp-hr	3-05-025-99
15	User defined, see Lookup Table	0	0	0

* OFF ROAD INCLUDES MINING AND EARTH MOVING EQUIPMENT
** MISC - OFF ROAD INCLUDES NG/LPG LOADER, FORKLIFTS, ETC.
*** LIGHT DUTY INCLUDES CARS, VAS, SMALL TRUCKS, ECT.
**** ON ROAD INCLUDES TRUCKS, ETC .

1000 hp-hr = THOUSAND OF HORSEPOWER HOURS
1000 GAL = THOUSAND OF GALLONS OF LIQUID FUEL
1000 VTM = THOUSAND VEHICLE MILES TRAVELED
MMCF = MILLION OF CUBIC FEET OF NATURAL GAS

EMISSIONS

DEVICE # 90001,2

PROCESS ID	CODE	EQUIPMENT TYPE	PROCESS RATE UNITS PER YEAR / UNITS	SOURCES CLASSIFICATION CODE SCC /CAS #	ORGANIC GASES TOG 43101	ORGANIC GASES FRAC ROG / VOC	CO 42101	NOx 42603	SOx 42401	PARTICULATE MATTER PM 11101	PARTICULATE MATTER FRAC PM_{10} / $PM_{2.5}$
					EMISSIONS FACTORS (pounds per unit of usage) / ANNUAL EMISSIONS (tons per year)						
1	1	HEAVY DUTY - OFF ROAD *	1,105.0	3-05-025-99	2.42	0.9676	7.50	24.25	2.91	1.54	0.994
			1000 hp-hr	Annual Emissions	1.337	1.294	4.144	13.398	1.608	0.851	0.846
2	7	Low emission Tier I	77.3	3-05-025-99	0.44	0.97	1.1	15.2	2.9	0.24	0.99
			1000 hp-hr	Annual Emissions	0.017	0.016	0.043	0.587	0.112	0.009	0.009
3	5	LIGHT DUTY VEHICLES ***	0.42	3-05-025-99	2.92	0.914	18.79	2.32	0.12	0.47	0.45
			1000 VMT	Annual Emissions	0.001	0.001	0.004	0.000	0.000	0.000	0.000

	TOG	ROG / VOC	CO	NOx	SOx	PM	PM_{10} / $PM_{2.5}$
TOTAL EMISSIONS	1.355	1.311	4.190	13.986	1.720	0.860	0.855

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS UNPAVED ROADS - ENTRAINED DUST	FORM MINE UPR

DATA INPUT BY FACILITY | DATA FROM ANOTHER WORKSHEET | OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc   COMPANY NUMBER: 90
FACILITY NAME: White Knob Quarry   FACILITY NUMBER: 461

DEVICE # **90013**

Process Number	Vehicle type	Road Type * Ind / Pub	Vehicle Weigh (tons) Empty	Loaded	Mean	Distance Traveled per Year (vmt) Round Trip Miles	Trips per Day	Days per Year	Miles per Year	Mean Vehicle Sped (mph)	Silt Loading * %	Moisture %
1	T. Haul Ore to Crusher	Ind	70	145	107.5	0.6	10.7	260	1,669.2	25	8	1.5
2	T. Haul Ore to Plant	Ind	70	150	110.0	13	7.2	260	24,336.0	25	8.3	1.5
3	Haul Crush to Waste	Ind	100	150	125.0	0.03	4.5	260	35.1	25	10	1.5
4	Haul Quarry to Waste	Ind	43.3	93.3	68.3	1.95	2.7	260	1,368.9	25	10	1.5
5	Loader	Ind	100	116	108.0	0.02	109	260	566.8	5	10	1.5
6	Drill rig	ind	35	35	35.0	0.02	12	260	62.4		10	1.5
12					0.0				0.0		11	0.2

* Road Type
Ind = Unpaved road surfaces a industrial sites
Pub = Publicly accessible roadways dominated by light duty vehicles

* For other Silt Loadings % is cells 'A167' through 'D178'.

Process Number	Vehicle Type	Road Type	Dust Control Method (Check "X" only one method per emission source (row) and complete appropriate cells below) Method Cells	None none	Water D52-D63 or E52-G63	Water with Suppressants H52 - M63	Surface Improvement D70 - E 81	Wind Screens or Wind Breaks G70 - H81	Other I70 - M81
1	T. Haul Ore to Crusher	Ind				x			
2	T. Haul Ore to Plant	Ind				x			
3	Haul Crush to Waste	Ind				x			
4	Haul Quarry to Waste	Ind				x			
5	Loader	Ind			x				
6	Drill rig	ind			x				
12	0	0		X					

Process Number	Vehicle Type	Road Type	Dust Control Method: Water (Either new moisture content or application rate) New Surface Moisture Content (%)	Water Application Rate: Traffic Rate vehicles per hour	Hours between Application	Intensity of water gallons / sq yd of Roadway *	Water with Suppressant: Type or Name of Suppressant	Intensity of Suppressant Gallons / sq yd of Roadway *	Frequency of Application (Check (X) only one): Weekly Ever 7 days	Bi-Weekly Every 14 days	Monthly Every 30 - 31 days	Bi-Monthly Every 61 day
1	T. Haul Ore to Crusher	Ind		4.4	4		MgCI	0.15			x	
2	T. Haul Ore to Plant	Ind		3	4		MgCI	0.15			x	
3	Haul Crush to Waste	Ind		1.3	4		MgCI	0.15			x	
4	Haul Quarry to Waste	Ind		4.7	4		MgCI	0.15			x	
5	Loader	Ind	3	58.7	4	0.2						
6	Drill rig	ind	1.5	3	4	0.1						
12	0	0										

(* 0.1 gallons of water or suppressant per square yard of road = 1760 gallons per mile of a 30 foot wide road.)

Process Number	Vehicle Type	Road Type	Dust Control Method: Surface Improvement New Silt Content (%) 3 Months after Application	6 Months after Application	Average	Wind Screens or Wind Breaks Height (feet)	Width (feet)	Other Name/Type	Description	Control Efficiency (%)
1	T. Haul Ore to Crusher	Ind			8				MgCI	75
2	T. Haul Ore to Plant	Ind			8.3				MgCI	75
3	Haul Crush to Waste	Ind			10				MgCI	75
4	Haul Quarry to Waste	Ind			10				MgCI	75
5	Loader	Ind			10				Water Truck	50
6	Drill rig	ind			10				Water truck	50
12	0	0			11					

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS UNPAVED ROADS - ENTRAINED DUST	FORM MINE UPR

EMISSIONS

DEVICE # 90014

Emission Factor pounds per vehicle miles traveled

Industrial Roads

EmFac = k * (s / 12)^a * (W / 3)^b

Public Road

EmFac = k * ({[(s / 12)^a * (S / 30)^d] / (M / 0.5)^c} -C)*[(365 - P)/365]

k, a, b, c, & d = Constants - See Lookup Table entitled "Constants for Emission Factor Equations"

s = Silt content of unpaved surface in percent (%)

W = Average vehicle weight in tons

S = Mean vehicle speed (mph)

M = Moisture content of unpaved surface in percent (%)

P = Number of days per year with at least 0.01 inches of precipitation - see MetData worksheet Cell ' C16.

Process Number	Vehicle Type	Throughput Road Type	vmt	Emission Factors Uncontrolled (pounds / vmt) PM	PM_{10}	PM_{10}
1	T. Haul Ore to Crusher	Ind	1,669.2	17.454	4.927	0.755
2	T. Haul Ore to Plant	Ind	24,336.0	18.096	5.146	0.789
3	Haul Crush to Waste	Ind	35.1	21.837	6.446	0.988
4	Haul Quarry to Waste	Ind	1,368.9	16.637	4.911	0.753
5	Loader	Ind	566.8	20.447	6.035	0.925
6	Drill rig	ind	62.4	12.315	3.635	0.557
12	0	0	0.0	0.000	0.000	0.000
		TOTAL	28,038.4	18.026	5.137	0.788
	Number of Devices	6				

Fractionation Value PM_{10}	PM_{10}
0.282	0.043
0.284	0.044
0.295	0.045
0.295	0.045
0.295	0.045
0.295	0.045
0.000	0.000
0.285	0.044

Process Number	Vehicle Type	Road Type	Efficiency percentage (%) of Dust Control Methods: None	Water: New Surface Moisture Content (%)	Water Application Rate *	Water with Suppressants	Surface Improvement	Wind Screens or Wind Breaks	Other	Overall
1	T. Haul Ore to Crusher	Ind	0.00	0.00	0.00	75.00	0.00	0.00	75.00	75.00
2	T. Haul Ore to Plant	Ind	0.00	0.00	0.00	75.00	0.00	0.00	75.00	75.00
3	Haul Crush to Waste	Ind	0.00	0.00	0.00	75.00	0.00	0.00	75.00	75.00
4	Haul Quarry to Waste	Ind	0.00	0.00	0.00	75.00	0.00	0.00	75.00	75.00
5	Loader	Ind	0.00	75.00	-5.66	E	0.00	0.00	50.00	75.00
6	Drill rig	ind	0.00	0.00	89.20	E	0.00	0.00	50.00	89.20
12	0	0	0.00	0.00	0.00	E	0.00	0.00	0.00	0.00

* Dust Controls - Water Application Rate

C = 100 - (0.0012 * A * D * T) / I

C = Control efficiency (%)

A = pan evaporation rate (inches)

D = Vehicles per hour

T = Hours between watering

I = Gallons / sq. yd (Note 0.1 gallon/sq yd = 1760 gallons per mile for a 30 foot wide road.)

Process Number	Vehicle Type	Road Type	Efficiency (%)	Emission Factor - Controlled (pounds/vmt) PM	PM_{10}	$PM_{2.5}$
1	T. Haul Ore to Crusher	Ind	75.00	4.363	1.232	0.189
2	T. Haul Ore to Plant	Ind	75.00	4.524	1.286	0.197
3	Haul Crush to Waste	Ind	75.00	5.459	1.611	0.247
4	Haul Quarry to Waste	Ind	75.00	4.159	1.228	0.188
5	Loader	Ind	75.00	5.112	1.509	0.231
12	0	0	0.00	0.000	0.000	0.000
		TOTAL	75.03	4.502	1.283	0.197

	Emissions (tpy) PM	PM_{10}	$PM_{2.5}$
	3.642	1.028	0.158
	55.047	15.653	2.400
	0.096	0.028	0.004
	2.847	0.840	0.129
	1.449	0.428	0.066
	0.000	0.000	0.000
TOTAL	63.121	17.990	2.758

EMISSION YEAR 2008	HARP / CEIDARS MINING OPERATIONS WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROADS	FORM MINE ERO

DATA INPUT BY FACILITY	DATA FROM ANOTHER WORKSHEET	OUTPUT DATA TO CEIDARS

COMPANY NAME: Omya California Inc — COMPANY NUMBER: 90

FACILITY NAME: White Knob Quarry — FACILITY NUMBER: 461

DEVICE # **90014a**

Process Number	Parking Areas acres	Disturbed Areas acres	Vegetative cover fraction	Moisture Natural %	Threshold Friction Velocity Area Use Code *	Threshold Friction Velocity Usage Name	Ratio of Wind Speed to Friction Velocity Area Use Code **	Ratio of Wind Speed to Friction Velocity Usage Name
1		5.25		0.5	3	Construction Site	3	Moderate Industrial / Mining
2		3.9		0.5	3	Construction Site	3	Moderate Industrial / Mining
10				0.5		None		None

* Threshold Friction Velocity Code	Area Usage
0	None
1	Mine Tailings
2	Abandoned Agricultural Land
3	Construction Site
4	Disturbed Desert
5	Scrub Desert
6	Coal Dust
7	Active Agricultural Land
8	Coal Pile
9	User Defined
10	User Defined
11	User Defined
12	User Defined

** Ration of Wind Speed to Friction Velocity Code	Area Usage
0	None
1	Open Space
2	Light Industrial / Mining
3	Moderate Industrial / Mining
4	Heavy Industrial / Mining
5	User Defined
6	User Defined
7	User Defined
8	User Defined
9	User Defined
10	User Defined

Process Number	Total Parking and Disturbed Areas	Dust Controls (Check 'x' only one method) None check (x)	Water Spray check (x)	Water Spray Water Added gallons per acre per day	New Surface Moisture Content (%) Calculated from Added Water	New Surface Moisture Content (%) As Measured (%)	Moisture Content for Calculation	Wind Screen check (x)	Other check (x)	Other Specify	Efficiency (%)
1	5.25				-0.32		0.00		X	MgCl	75
2	3.9		x	1000	8.87		8.87				
10	0	x			-0.32		0.00				

EMISSION YEAR 200 8	HARP / CEIDARS MINING OPERATIONS WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROADS	FORM MINE ERO

EMISSIONS

DEVICE # **90014a**

Emission Factor - pounds per acre

EmFac = 2.814 * k *(1 - v) * (u / u_t)^3 * C(x)*2000

k = Aerodynamic Factor for Particulate Size
v = Amount of Vegetative cover as a Fraction
u = Mean Wind Speed in Meters per Second (m/s)
u_t = Threshold Value of Wind Speed (m/s)
C(x) = Correction Factor

Aerodynamic Factor
TSP = 1.0
PM_{10} = 0.5
$PM_{2.5}$ = 0.2

x = u_t/u

Threshold Value of Wind Speed - u_t
$u_t = u^*_t * u^*$

Process Number	Throughput Parking Areas Acres	Throughput Disturbed Area Acres	Threshold Friction Velocity u^*_t m/s	Ratio u^*	Threshold Wind Speed u_t m/s	x	Correction Factor C(x)	Emission Factors TSP pounds/acre	PM_{10} pounds/acre	$PM_{2.5}$ pounds/acre
1	0	5.25	0.26	6.5	1.69	0.44	1.90	90,332.145	45,166.072	18,066.429
2	0	3.9	0.26	6.5	1.69	0.44	1.90	90,332.145	45,166.072	18,066.429
10	0	0	0	0	0	0.00	0.00	0.000	0.000	0.000
	INPUTS	9.15						90,332.145	45,166.072	18,066.429
	Number of Devices	0								

Process Number	Total Parking and Disturbed Areas Acres	Fractionation Value PM_{10}	$PM_{2.5}$
1	5.25	0.5	0.2
2	3.9	0.5	0.2
10	0	0	0
	INPUTS	0.5	0.2

Process Number	Total Parking and Disturbed Areas Acres	Controls Type	Efficiency (%)	Emission Factor - Controlled (pounds/acre) TSP	PM_{10}	$PM_{2.5}$
1	5.25	MgCl	75.0	22,583.036	11,291.518	4,516.607
2	3.9	Water Spray	95.0	4,516.607	2,258.304	903.321
10	0	None	0.0	0.000	0.000	0.000
		INPUTS	83.52	14,882.591	7,441.296	2,976.518

	Emissions (tpy) = Area * EmFac TSP	PM_{10}	$PM_{2.5}$
	59.280	29.640	11.856
	8.807	4.404	1.761
	0.000	0.000	0.000
TOTAL	68.088	34.044	13.618

Ore to Primary Crusher											MAX	AVG - ALL YEARS	AVG - 2004,2005,2
USDT	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**			
Sentinel	325,951	377,760	386,835	467,520	309,880	237,946	189,453	154,967	280,363	210,316	467,520	294,099	388,078
Butterfield	-	-	-	41,701	128,948	97,601	80,575	50,018	47,628	48,972	128,948	49,544	56,883
White Kno	261,244	274,193	309,168	311,999	350,895	212,999	190,274	52,758	228,414	144,075	350,895	233,602	324,021
Ore Hauled to Plant													
USDT	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**			
Sentinel	277,058	321,096	328,810	397,392	263,398	202,254	161,035	131,722	238,309	178,768	397,392	249,984	329,867
Butterfield	-	-	-	35,446	109,606	82,961	68,489	42,515	40,483	41,627	109,606	42,113	48,351
White Kno	222,057	233,064	262,793	265,199	298,261	181,049	161,733	44,844	194,152	122,463	298,261	198,562	275,418
Waste													
USDT	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**			
Sentinel	178,260	171,504	204,702	184,440	207,780	203,074	165,940	109,181	305,832	782,285	782,285	251,300	198,974
Butterfield	-	-	-	59,376	81,624	185,546	34,820	15,256	85,687	116,028	185,546	57,834	47,000
White Kno	164,666	159,728	151,860	281,698	130,590	169,776	61,020	1,250	85,766	103,348	281,698	130,970	188,049

j:\accounting\california\ca 2002\fuel\diesel2004

DIESEL DISTRIBUTION includes Amboy

YEAR: 2004

MONTH: December

BEGINNING	88372.0		
RECEIVED	45932.0		
		CALCULATED GALLONS	
ENDING READING	100414.0	includes Sentinel fuel tank and	
GALLONS USED - MONTH	33890.0	MONTH	24354.0
GALLONS USED - Y.T.D.	510602.0	Y.T.D.	374701.7

EQUIP #	YEAR	MFG	DESCRIPTION	UNLOADED WEIGHT/TON	MONTH GALLONS USED	MONTH HOURS	GALLONS PER HOUR	Y.T.D. GALLONS USED	Y.T.D. HOURS
205300	1978	GROVE	CRANE	25.00	2.7	1.0	2.7	124.2	46.0
208252	1987	CAT	FORKLIFT	5.50	0.0	0.0	0.6	54.6	91.0
213400	1990	CHAMP	FORKLIFT	8.00	18.0	9.0	2.0	210.0	105.0
293413	1984	I.H.	ROAD SWEEPER		0.0		0.6	0.6	1.0
298600	1992	CAT	966F LOADER	22.00	118.4	16.0	7.4	1916.6	259.0
293301	1988		BOBCAT	2.00	0.0		0.6	0.0	0.0
299000			DUMP TRUCK		65.0	13.0	5.0	687.5	137.5
330200	1985	CAT	992C LOADER	100.00	1098.0	45.0	24.4	13517.6	554.0
330500	1987	CAT	992C LOADER		512.4	21.0	24.4	14932.8	612.0
330600			BOBCAT		6.0	10.0	0.6	66.0	110.0
330700			BOBCAT		3.0	5.0	0.6	30.6	51.0
330800		CAT	992C CAT LOADER		39.0	65.0	0.6	383.4	639.0
330900		TEREX	94 TON HAUL TRUCK		0.6	1.0	0.6	831.6	1386.0
331200		CAT	988 LOADER		0.0		24.4	24.4	1.0
332102	1970	KENWORTH	GREASE TRUCK	20.00	5.0	1.0	5.0	158.5	31.7
332132	1988		LUBE VAN	20.00	105.0	21.0	5.0	1600.0	320.0
332136	1974		FUEL TRUCK		35.0	7.0	5.0	325.0	65.0
333018			TD 25 DOZER		0.0	0.0	10.7	246.1	23.0
333046	1989	CAT	992C LOADER	100.00	2293.6	94.0	24.4	33964.8	1392.0
333053	1983	PAYHAULER	350B TRUCK	36.00	823.2	98.0	8.4	3956.4	471.0
333060	1987	CAT	992C LOADER	100.00	2537.6	104.0	24.4	31720.0	1300.0
333062	1990	CAT	D9N DOZER	46.00	25.0	2.0	12.5	2725.0	218.0
333064			EXCAVATOR	46.00	73.0	10.0	7.3	1905.3	261.0
333091	1985	PAYHAULER	350B TRUCK	36.00	966.0	115.0	8.4	7593.6	904.0
333098	1985	PAYHAULER	350B TRUCK	36.00	268.8	32.0	8.4	3511.2	418.0
333251	1983	TEREX	85 TON TRUCK	70.00	1646.4	98.0	16.8	39765.6	2367.0
333252	1984	TEREX	85 TON TRUCK	70.00	2990.4	178.0	16.8	44788.8	2666.0
333257		TEREX			1797.6	107.0	16.8	8541.2	510.8
333254	1986	TEREX	85 TON TRUCK	70.00	2284.8	136.0	16.8	34591.2	2059.0
333255	1987	TEREX	85 TON TRUCK	70.00	772.8	46.0	16.8	39597.6	2357.0
333256	1991	TEREX	85 TON TRUCK	70.00	3024.0	180.0	16.8	22411.2	1334.0
333410	1978		GRADER	16.00	144.0	24.0	6.0	3450.0	575.0
333411	1978	PAYHAULER	WATER TRUCK	50.00	25.2	3.0	8.4	4006.8	477.0

DIESEL

YEAR: 2004
MONTH: December

EQUIP #	YEAR	MFG	DESCRIPTION	UNLOADED WEIGHT/TON	MONTH GALLONS USED	MONTH HOURS	GALLONS PER HOUR	Y.T.D. GALLONS USED	Y.T.D. HOURS
825700	1991	CAT	FORKLIFT	5.50	0.0	0.0	0.6	75.6	126.0
825400	1992	CAT	FORKLIFT	5.50	5.4	9.0	0.6	77.4	129.0
825900	1993	CAT	FORKLIFT	5.50	0.0	0.0	0.6	0.0	0.0
826000	1993	AMERICAN LINC	SWEEPER		0.6	1.0	0.6	40.2	67.0
826100	1994	CAT	FORKLIFT	5.50	0.0	0.0	0.6	146.4	244.0
826300	1995	BAKER	FORKLIFT		14.4	24.0	0.6	390.0	650.0
826400	1995	BAKER	FORKLIFT		3.6	6.0	0.6	124.2	207.0
826500	1997	BAKER	FORKLIFT		97.2	162.0	0.6	1008.6	1681.0
826600	1998	BAKER	FORKLIFT		0.0	0.0	0.6	225.6	376.0
826700	1999	BAKER	FORKLIFT		66.0	110.0	0.6	1445.4	2409.0
826800	2000	BAKER	FORKLIFT		155.4	259.0	0.6	1773.0	2955.0
826900	2001	LINDE H300-03	FORKLIFT		164.4	274.0	0.6	2347.8	3913.0
827000	2003	LINDE H300-351	FORKLIFT		201.0	335.0	0.6	2999.3	4998.9
827100	2003	TENANT	SWEEPER		0.0	15.0	0.6	36.0	201.0
827200	2004	BAKER	FORKLIFT		0.0	180.0	0.6	0.0	1387.0
6100 1102 WHITE KNOB GEN SET					1438.5	137.0	10.5	5071.5	1887.0
6160 AMBOY					0.0	0.0		0.0	0.0
					0.0	0.0		0.0	0.0
					0.0	0.0		0.0	0.0
DONNER					527.0	0.0		22736.9	0.0
					24354.0				

		GALLONS USED	PRICE PER GAL	ENTRY $'s	
6100 2300	PLANT MAINT	2.7	1.6324	4.41	
6100 1700	HEAVY EQUPMENT MAINT	18.0	1.6324	29.38	
6100 0400	PLANT ADMIN	183.4	1.6324	299.39	
6100 1600	HEAVY EQUIPMENT	21476.4	1.6324	35058.50	
DONNER		527.0	1.6324	860.29	
PROFIT			1.6324		129.04
		0.0	1.6324	0.00	
			1.6324		0.00
		0.0	1.6324	0.00	
			1.6324		0.00
		0.0	1.6324	0.00	
6100 1102	WHITE KNOB GEN SET	1438.5	1.6324	2348.24	
6160 AMBOY		0.0	1.6324	0.00	
6100 5511	PACKAGING	708.0	1.6324	1155.75	
		24354.0	1.6324	39755.96	

DONNER

	Begin	End	Used
PUMP 1(NO TENTHS)	206714.0	206714.0	0.0
PUMP 2	26001.2	26528.2	527.0
QUARRY	583715.0	583715.0	0.0
			527.0

j:\accounting\california\ca 2002\fuel\diesel2004

DIESEL DISTRIBUTION includes Amboy

YEAR: 2005

MONTH: December

BEGINNING	144365.0		
RECEIVED	77063.0	CALCULATED GALLONS	
ENDING READING	160167.0	includes Sentinel fuel tank and	
GALLONS USED - MONTH	61261.0	MONTH	50467.8
GALLONS USED - Y.T.D.	614022.0	Y.T.D.	492845.6

EQUIP #	YEAR	MFG	DESCRIPTION	UNLOADED WEIGHT/TON	MONTH GALLONS USED	MONTH HOURS	GALLONS PER HOUR	Y.T.D. GALLONS USED	Y.T.D. HOURS
205300	1978	GROVE	CRANE	25.00	8.1	3.0	2.7	148.5	55.0
208252	1987	CAT	FORKLIFT	5.50	0.6	1.0	0.6	74.4	124.0
213400	1990	CHAMP	FORKLIFT	8.00	10.0	5.0	2.0	110.0	55.0
293413	1984	I.H.	ROAD SWEEPER		0.0		0.6	0.0	0.0
298600	1992	CAT	966F LOADER	22.00	96.2	13.0	7.4	2057.2	278.0
293301	1988		BOBCAT	2.00	0.0		1.5	0.0	0.0
299000	1989	PETERBILT	DUMP TRUCK		300.0	60.0	5.0	3613.5	731.7
330100		CAT	988B LOADER		0.0	0.0	24.4	0.0	0.0
330200	1985	CAT	992C LOADER	100.00	2171.6	89.0	24.4	21228.0	870.0
330500	1987	CAT	992C LOADER		1756.8	72.0	24.4	17446.0	715.0
330600			BOBCAT		6.0	4.0	1.5	111.3	109.0
330700			BOBCAT		18.0	12.0	1.5	97.8	82.0
330800		CAT	992C CAT LOADER		2342.4	96.0	24.4	9806.2	834.0
330900		TEREX	94 TON TRUCK		0.0		16.8	10403.4	1220.0
331200		CAT	988 LOADER		0.0		24.4	170.8	7.0
332102	1970	KENWORTH	GREASE TRUCK	20.00	10.0	2.0	5.0	135.0	27.0
332132	1988		LUBE VAN	20.00	105.0	21.0	5.0	1650.0	330.0
332136	1974		FUEL TRUCK		35.0	7.0	5.0	540.0	108.0
333018			TD 25 DOZER		0.0		10.7	149.8	14.0
333046	1989	CAT	992C LOADER	100.00	2440.0	100.0	24.4	35380.0	1450.0
333053	1983	PAYHAULER	350B TRUCK	36.00	848.4	101.0	8.4	9433.2	1123.0
333060	1987	CAT	992C LOADER	100.00	3123.2	128.0	24.4	33501.2	1373.0
333062	1990	CAT	D9N DOZER	46.00	0.0		12.5	825.0	66.0
333064			EXCAVATOR	46.00	591.3	81.0	7.3	2496.6	342.0
333091	1985	PAYHAULER	350B TRUCK	36.00	1050.0	125.0	8.4	9962.4	1186.0
333098	1985	PAYHAULER	350B TRUCK	36.00	940.8	112.0	8.4	8929.2	1063.0
333251	1983	TEREX	85 TON TRUCK	70.00	2805.6	167.0	16.8	41529.6	2472.0
333252	1984	TEREX	85 TON TRUCK	70.00	3931.2	234.0	16.8	48955.2	2914.0
333254	1986	TEREX	85 TON TRUCK	70.00	5275.2	314.0	16.8	47661.6	2837.0
333255	1987	TEREX	85 TON TRUCK	70.00	5460.0	325.0	16.8	55120.8	3281.0
333256	1991	TEREX	85 TON TRUCK	70.00	4468.8	266.0	16.8	28812.0	1715.0
333257	2002	TEREX	70 TON TRUCK		1041.6	62.0	16.8	10567.2	629.0
333410	1978		GRADER	16.00	120.0	20.0	6.0	4350.0	725.0
333411	1978	PAYHAULER	WATER TRUCK	50.00	319.2	38.0	8.4	5040.0	600.0

DIESEL

YEAR: 2005
MONTH: December

EQUIP #	YEAR	MFG	DESCRIPTION	UNLOADED WEIGHT/TON	MONTH GALLONS USED	MONTH HOURS	GALLONS PER HOUR	Y.T.D. GALLONS USED	Y.T.D. HOURS
825700	1991	CAT	FORKLIFT	5.50	0.0	0.0	0.6	0.0	0.0
825400	1992	CAT	FORKLIFT	5.50	0.0	0.0	0.6	43.8	73.0
825900	1993	CAT	FORKLIFT	5.50	0.0	0.0	0.6	0.0	0.0
826000	1993	AMERICAN LINC	SWEEPER		0.6	1.0	0.6	3.6	6.0
826100	1994	CAT	FORKLIFT	5.50	0.0	0.0	0.6	9.0	15.0
826300	1995	BAKER	FORKLIFT		21.6	36.0	0.6	210.6	351.0
826400	1995	BAKER	FORKLIFT		21.6	36.0	0.6	145.2	242.0
826500	1997	BAKER	FORKLIFT		12.6	21.0	0.6	802.2	1337.0
826600	1998	BAKER	FORKLIFT		19.2	32.0	0.6	606.0	1010.0
826700	1999	BAKER	FORKLIFT		62.4	104.0	0.6	1009.8	1683.0
826800	2000	BAKER	FORKLIFT		105.0	175.0	0.6	1367.4	2279.0
826900	2001	LINDE H300-03	FORKLIFT		206.4	344.0	0.6	1976.4	3294.0
827000	2003	LINDE H300-351	FORKLIFT		211.8	353.0	0.6	2482.8	4138.0
827100	2003	TENANT	SWEEPER		0.0	8.0	0.6	91.2	911.0
827200	2004	BAKER	FORKLIFT		0.0	188.0	0.6	667.2	2192.0
6100 1102 WHITE KNOB GEN SET					2110.5	201.0	10.5	4935.0	470.0
6160 AMBOY					0.0	0.0		0.0	0.0
					0.0	0.0		0.0	0.0
					0.0	0.0		19285.5	0.0
DONNER					8421.1	0.0		32585.2	0.0
					50467.8				

		GALLONS USED	PRICE PER GAL	ENTRY $'s	
6100 2300	PLANT MAINT	8.7	2.1893	19.05	
6100 1700	HEAVY EQUPMENT MAINT	10.0	2.1893	21.89	
6100 0400	PLANT ADMIN	396.2	2.1893	867.40	
6100 1600	HEAVY EQUPMENT	38860.1	2.1893	85076.03	
DONNER		8421.1	2.1893	18436.23	
PROFIT			2.1893		2765.43
		0.0	2.1893	0.00	
			2.1893		0.00
		0.0	2.1893	0.00	
			2.1893		0.00
		0.0	2.1893	0.00	
6100 1102	WHITE KNOB GEN SET	2110.5	2.1893	4620.50	
6160 AMBOY		0.0	2.1893	0.00	
6100 5511	PACKAGING	661.2	2.1893	1447.56	
		50467.8	2.1893	110488.65	

DONNER

	Begin	End	Used
PUMP 1(NO TENTHS)	206714.0	206714.0	0.0
PUMP 2	30505.3	31423.4	918.1
QUARRY	602250.0	609753.0	7503.0
			8421.1

j:\accounting\california\ca 2002\fuel\diesel2006

DIESEL DISTRIBUTION includes Amboy

YEAR: 2006

MONTH: December

BEGINNING	133657.0	
RECEIVED	80161.0	CALCULATED GALLONS
ENDING READING	155505.0	includes Sentinel fuel tank and
GALLONS USED - MONTH	58313.0	MONTH 37326.2
GALLONS USED - Y.T.D.	621145.0	Y.T.D. 533724.4

EQUIP #	YEAR	MFG	DESCRIPTION	UNLOADED WEIGHT/TON	MONTH GALLONS USED	MONTH HOURS	GALLONS PER HOUR	Y.T.D. GALLONS USED	Y.T.D. HOURS
205300	1978	GROVE	CRANE	25.00	0.0		2.7	0.0	0.0
207500	2000	SKYTRAK 10042	LIFTALL		0.0		6.0	522.0	87.0
213400	1990	CHAMP	FORKLIFT	8.00	8.0	4.0	2.0	156.0	78.0
293413	1984	I.H.	ROAD SWEEPER		0.0		0.6	0.0	0.0
298600	1992	CAT	966F LOADER	22.00	74.0	10.0	7.4	1768.6	239.0
299000	1989	PETERBILT	DUMP TRUCK		90.0	18.0	5.0	2055.0	785.1
299100	2002	BOBCAT	BOBCAT		0.0		1.5	25.5	17.0
330100	1986	CAT	988B LOADER		97.6	4.0	24.4	3196.4	771.1
330200	1985	CAT	992C LOADER	100.00	2244.8	92.0	24.4	24351.2	219.0
330500	1987	CAT	992C LOADER		2586.4	106.0	24.4	19422.4	1012.0
330600	1984	BOBCAT	BOBCAT		40.5	27.0	1.5	268.8	717.0
330700	1984	BOBCAT	BOBCAT		36.0	24.0	1.5	261.0	181.0
330800	1985	CAT	992C CAT LOADER		2147.2	88.0	24.4	35454.8	241.0
330900	1997	TEREX	94 TON HAUL TRUCK		1764.0	105.0	16.8	22008.0	1552.0
332102	1970	KENWORTH	GREASE TRUCK	20.00	0.0	0.0	5.0	125.0	1205.0
332132	1988	AUTOCAR	LUBE VAN	20.00	65.0	13.0	5.0	995.0	38.0
332136	1974	WHITE	FUEL TRUCK		35.0	7.0	5.0	410.0	193.0
333018	1978	INTERNATIONAL	TD 25 DOZER		0.0	0.0	10.7	331.7	75.0
333046	1989	CAT	992C LOADER	100.00	1122.4	46.0	24.4	29890.0	77.0
333053	1983	PAYHAULER	350B TRUCK	36.00	58.8	7.0	8.4	5014.8	1186.0
333060	1987	CAT	992C LOADER	100.00	2391.2	98.0	24.4	27010.8	688.0
333062	1990	CAT	D9N DOZER	46.00	0.0	0.0	12.5	375.0	1009.0
333064	1990	CAT	EXCAVATOR	46.00	36.5	5.0	7.3	2029.4	35.0
333091	1985	PAYHAULER	350B TRUCK	36.00	134.4	16.0	8.4	8265.6	289.0
333098	1985	PAYHAULER	350B TRUCK	36.00	109.2	13.0	8.4	5359.2	981.0
333251	1983	TEREX	85 TON TRUCK	70.00	3511.2	209.0	16.8	40908.0	834.0
333252	1984	TEREX	85 TON TRUCK	70.00	705.6	42.0	16.8	41428.8	2268.0
333254	1986	TEREX	85 TON TRUCK	70.00	2671.2	159.0	16.8	39984.0	2583.0
333255	1987	TEREX	85 TON TRUCK	70.00	2990.4	178.0	16.8	42823.2	2399.0
333256	1991	TEREX	85 TON TRUCK	70.00	4300.8	256.0	16.8	46502.4	2627.0
333257	2002	TEREX	70 TON TRUCK		940.8	56.0	16.8	19202.4	2568.0
333410	1978	CAT	GRADER	16.00	276.0	46.0	6.0	3222.0	1133.0
333411	1978	PAYHAULER	WATER TRUCK	50.00	680.4	81.0	8.4	6207.6	572.0

DIESEL

YEAR: 2006
MONTH: December

EQUIP #	YEAR	MFG	DESCRIPTION	UNLOADED WEIGHT/TON	MONTH GALLONS USED	MONTH HOURS	GALLONS PER HOUR	Y.T.D. GALLONS USED	Y.T.D. HOURS
825400	1992	CAT	FORKLIFT	5.50	7.8	13.0	0.6	77.4	129.0
826000	1993	AMERICAN LINC	SWEEPER		0.0	0.0	0.6	0.0	0.0
826300	1995	BAKER	FORKLIFT		15.0	25.0	0.6	208.8	348.0
826400	1995	BAKER	FORKLIFT		32.4	54.0	0.6	338.4	564.0
826500	1997	BAKER	FORKLIFT		33.6	56.0	0.6	676.2	1127.0
826600	1998	BAKER	FORKLIFT		31.8	53.0	0.6	956.4	1594.0
826700	1999	BAKER	FORKLIFT		48.6	81.0	0.6	787.2	1312.0
826800	2000	BAKER	FORKLIFT		181.8	303.0	0.6	1185.0	1975.0
826900	2001	LINDE H300-03	FORKLIFT		69.6	116.0	0.6	2265.0	3775.0
827000	2003	LINDE H300-351	FORKLIFT		90.6	151.0	0.6	2589.6	4316.0
827100	2003	TENANT	SWEEPER		6.6	11.0	0.6	90.6	207.0
827200	2004	BAKER	FORKLIFT		102.0	170.0	0.6	1041.6	2383.0
6100 1102 WHITE KNOB GEN SET					2509.5	239.0	10.5	5239.5	499.0
6160 AMBOY					0.0	0.0		22217.2	0.0
					0.0	0.0		3175.0	0.0
EQUIPMENT LEASING					3063.0	0.0		31928.1	0.0
LV DRILLING					2016.5	0.0		13715.1	0.0
					37326.2				

	GALLONS USED	PRICE PER GAL	ENTRY $'s	
6100 2300 PLANT MAINT	0.0	2.2830	0.00	
6100 1700 HEAVY EQUPMENT MAINT	8.0	2.2830	18.26	
6100 0400 PLANT ADMIN	164.0	2.2830	374.41	
6100 1600 HEAVY EQUPMENT	28945.4	2.2830	66081.77	
DONNER	2016.5	2.2830	4603.63	
PROFIT		2.2830		690.54
	0.0	2.2830	0.00	
		2.2830		0.00
	3063.0	2.2830	6992.77	
		2.2830		1048.92
	0.0	2.2830	0.00	
6100 1102 WHITE KNOB GEN SET	2509.5	2.2830	5729.14	
6160 AMBOY	0.0	2.2830	0.00	
6100 5511 PACKAGING	517.8	2.2830	1182.13	
	37224.2	2.2830	84982.10	

DONNER

	Begin	End	Used
PUMP 1(NO TENTHS)	0.0	0.0	0.0
PUMP 2	0.0	0.0	0.0
QUARRY	0.0	0.0	0.0
			0.0

EIN	Veh serial num	Your veh num	Eng serial num	Eng Manufacturer	Eng Model	Eng Family	Eng MY	Eng HP	Eng Tier	Displacement (liters)	Date Purchase	Date Installed (Repowered)	Date Sold	On/Off-road engine	Non-diesel engine	Certified to a different standard
NX9N35	49Z01382	3308	73W17225	CATERPILLAR, INC.	3412	274NA031	1985	690	T0	27	1/1/1985	1/1/1985		off		
CY3E87	115049	2202	274NA038	CATERPILLAR, INC.	3306B	274NA038	1985	215	T0	10.5	1/1/1985	1/1/1985		off		
SJ9B97	50W11381	3301	BFF00423	CATERPILLAR, INC.	3408DITA	274NA035	1985	375	T0	18	1/1/1985	1/1/1985		off		
YB8P58	93U1347	3410	93U01904	CATERPILLAR, INC.	3406	274NA015	1987	275	T0	14.6	1/1/1987	1/1/1987		off		
RF7T38	501101	2232	4MG1811	CATERPILLAR, INC.	3406B	274NA037	1988	322	T0	14.6	1/1/1988	1/1/1988		off		
PB8T39	1XP5LB9X4K0283070	2290	7XC11192	CATERPILLAR, INC.	3406C	274NA039	1989	425	T0	14.6	1/1/1989	1/1/1989		off		
FN3U54	026N	3298	37103885	CUMMINS ENGINE CO., INC.	VT1710	274NA023	1990	635	T0	28	1/1/1990	1/1/1990		off		
CR6E85	1JD02200	3462	48W30034	CATERPILLAR, INC.	3408	274NA027	1990	370	T0	18	1/1/1990	1/1/1990		off		
XL3E34	T-3851060	3209	37206355	CUMMINS ENGINE CO., INC.	KT38C	274NA025	1991	1050	T0	38	1/1/1991	1/1/1991		off		
LL4Y77	105N	3291	10729894	CUMMINS ENGINE CO., INC.	VT1710	274NA024	1992	635	T0	28	1/1/1992	1/1/1992		off		
CC5P99	4YG00650	3303	08Z64168	CATERPILLAR, INC.	3306B	274NA033	1992	235	T0	10.5	1/1/1992	1/1/1992		off		
XV5P45	5BC1382	8254	274NA011	PERKINS ENGINES COMPANY LTD.	274NA011	274NA011	1992	52	T0	200	1/1/1992	1/1/1992		off		
EIN	Veh serial num	Your veh num	Eng serial num	Eng Manufacturer	Eng Model	Eng Family	Eng MY	Eng HP	Eng Tier	Displacement (liters)	Date Purchase	Date Installed (Repowered)	Date Sold	On/Off-road engine	Non-diesel engine	Certified to a different standard
KP3K99	49Z00973	3360	73W16485	CATERPILLAR, INC.	3412	274NA029	1994	690	T0	27	1/1/1994	1/1/1994		off		
BC6W93	49Z1405	3346	73W10267	CATERPILLAR, INC.	3412	274NA030	1995	690	T0	27	1/1/1995	1/1/1995		off		
TS6F56	5AF01016	3464	08Z57759	CATERPILLAR, INC.	3306	274NA026	1995	195	T0	10.5	1/1/1995	1/1/1995		off		

GM5E67	T3851027	3256	37157403	CUMMINS ENGINE CO., INC.	QST30	274NA016	1997	1050	T0	30	1/1/1997	1/1/1997		off		
NT4W68	AGC00349	3216	2GR02704	CATERPILLAR, INC.	3508	274NA022	2000	938	T1	34.5	1/1/2000	1/1/2000		off		
JF6Y78	H2X351L0187830	8268	U344163R	PERKINS ENGINES COMPANY LTD.	CP81149	XPKXL02.7CP1	2000	52	T1	2.7	1/1/2000	1/1/2000		off		
UM7G58	T7891011	3257	535EL0100200	DETROIT DIESEL CORPORATION	12V2000	274NA013	2000	760	T1	24	1/1/2000	1/1/2000		off		
HL7F58	H2X351L0061930	8269	U178812K	PERKINS ENGINES COMPANY LTD.	903	CP80820	2001	47	T1	2.79	1/1/2001	1/1/2001		off		
XD9V77	1HTGLAXT51H-338849	2271	2KS51137	CATERPILLAR, INC.	C-12	274NA041	2001	322	T2	12	1/1/2001	1/1/2001		off		
WX6V89	72473	3252	37203442	CUMMINS ENGINE CO., INC.	QST30	YCEXL030.AAA	2002	1050	T1	30	1/1/2002	1/1/2002		off		
RD4U73	H2X351P01199	8270	U178812K	PERKINS ENGINES COMPANY LTD.	CP81149	3PKXL02.7CP1	2003	52	T1	2.7	1/1/2003	1/1/2003		off		
GC4L77	21103	5171	356007	KUBOTA CORPORATION	V1505	274NA041	2003	52	T1	1.5	1/1/2003	1/1/2003		off		
EIN	Veh serial num	Your veh num	Eng serial num	**Eng Manufacturer**	**Eng Model**	**Eng Family**	Eng MY	Eng HP	Eng Tier	**Displacement (liters)**	Date Purchase	Date Installed (Repowered)	Date Sold	On/Off-road engine	Non-diesel engine	Certified to a different standard
MX9J35	73177	3255	37214062	CUMMINS ENGINE CO., INC.	QST30	274NA017	2004	1050	T1	30	1/1/2004	1/1/2004		off		
JU3C84	49Z00783	3302	80M05545	CATERPILLAR, INC.	3412 LE	274NA034	2004	690	T2	27	1/1/2004	1/1/2004		off		
HM9D53	040N	3253	5.31E+09	DETROIT DIESEL CORPORATION	8V2000	274NA019	2004	635	T2	200	1/1/2004	1/1/2004		off		

FX9A66	H2X393R02493	8272	BEU006123	VOLKSWAGEN OF AMERICA, INC.	BEU	274NA002	2004	57	T2	1.89	1/1/2004	1/1/2004		off		
SK8E79	49Z00901	3305	80M05725	CATERPILLAR, INC.	3412 LE	274NA032	2004	690	T2	27	1/1/2004	1/1/2004		off		
CH9K94	73176	3254	37214605	CUMMINS ENGINE CO., INC.	QST30	274NA018	2005	1050	T1	30	1/1/2005	1/1/2005		off		
LX5G75	N5531	3211	37110873	CUMMINS ENGINE CO., INC.	QSK 19	274NA014	2006	635	T3	19	1/1/2006	1/1/2006		off		Rebuild
YV9J85	1NKDL99X1SS655352	2237	34741843	CUMMINS ENGINE CO., INC.	M11-370L	RCE661EJDARW	1994	370	T0	10.8	12/27/2007	0000-00-00		off		

OMYA (California) Inc.

2004 PLANT KWH / TON BY MONTH

MONTH	PRODUCTION TONS	KWH USED	2004 KWH USED PER TON
JANUARY	37,319	1,753,718	46.99
FEBRUARY	50,419	1,754,299	34.79
MARCH	52,769	2,071,915	39.26
APRIL	52,625	1,894,301	36.00
MAY	52,963	1,733,040	32.72
JUNE	55,561	2,093,314	37.68
JULY	62,061	2,173,502	35.02
AUGUST	59,948	2,068,469	34.50
SEPTEMBER	54,791	2,064,754	37.68
OCTOBER	60,672	2,238,763	36.90
NOVEMBER	51,939	2,002,699	38.56
DECEMBER	51,321	2,236,882	43.59
TOTAL SHORT TONS	642,388	24,085,656	37.49
DMT	582,762		

2004 PLANT KWH / TON YEAR-TO-DATE

MONTH	PRODUCTION TONS	KWH USED	2004 KWH USED PER TON
JANUARY	37,319	1,753,718	46.99
FEBRUARY	87,738	3,508,017	39.98
MARCH	140,507	5,579,932	39.71
APRIL	193,132	7,474,233	38.70
MAY	246,095	9,207,273	37.41
JUNE	301,656	11,300,587	37.46
JULY	363,717	13,474,089	37.05
AUGUST	423,665	15,542,558	36.69
SEPTEMBER	478,456	17,607,312	36.80
OCTOBER	539,128	19,846,075	36.81
NOVEMBER	591,067	21,848,774	36.96
DECEMBER	642,388	24,085,656	37.49
Metric	582,762	24,085,656	41.33

Omya California Inc.

2005 PLANT KWH / TON BY MONTH

MONTH	PRODUCTION SHORT TONS	KWH USED	2005 KWH USED PER TON
JANUARY	49,451	1,894,003	38.30
FEBRUARY	49,757	1,987,080	39.94
MARCH	59,403	2,303,741	38.78
APRIL	56,580	2,274,389	40.20
MAY	56,110	2,127,898	37.92
JUNE	56,336	2,439,331	43.30
JULY	56,846	2,422,262	42.61
AUGUST	53,252	2,134,517	40.08
SEPTEMBER	56,586	2,543,467	44.95
OCTOBER	59,461	2,558,554	43.03
NOVEMBER	56,101	2,448,648	43.65
DECEMBER	48,944	2,242,656	45.82
TOTAL	658,827	27,376,546	41.55

2005 PLANT KWH / TON YEAR-TO-DATE

MONTH	PRODUCTION SHORT TONS	KWH USED	2005 KWH USED PER TON
JANUARY	49,451	1,894,003	38.30
FEBRUARY	99,208	3,881,083	39.12
MARCH	158,611	6,184,824	38.99
APRIL	215,191	8,459,213	39.31
MAY	271,301	10,587,111	39.02
JUNE	327,637	13,026,442	39.76
JULY	384,483	15,448,704	40.18
AUGUST	437,735	17,583,221	40.17
SEPTEMBER	494,321	20,126,688	40.72
OCTOBER	553,782	22,685,242	40.96
NOVEMBER	609,883	25,133,890	41.21
DECEMBER	658,827	27,376,546	41.55
METRIC	597,675	27,376,546	45.81

Omya California Inc.

2005 Sentinel KWH / TON BY MONTH

MONTH	PRODUCTION SHORT TONS	KWH USED	2005 KWH USED PER TON
JANUARY	8,580	10,579	1.23
FEBRUARY	1,560	10,872	6.97
MARCH	20,280	3,304	0.16
APRIL	22,464	9,074	0.40
MAY	60,792	12,807	0.21
JUNE	78,780	15,263	0.19
JULY	58,968	18,469	0.31
AUGUST	70,902	13,483	0.19
SEPTEMBER	54,756	16,070	0.29
OCTOBER	45,942	16,208	0.35
NOVEMBER	53,076	14,888	0.28
DECEMBER	57,786	18,340	0.32
TOTAL	533,886	159,357	0.30
METRIC	484,331	159,357	0.33

Omya California Inc.

2006 PLANT KWH / TON BY MONTH

MONTH	PRODUCTION SHORT TONS	KWH USED	2006 KWH USED PER TON
JANUARY	51,085	2,143,747	41.96
FEBRUARY	51,076	2,540,530	49.74
MARCH	55,005	2,125,277	38.64
APRIL	49,929	2,012,434	40.31
MAY	54,513	2,013,370	36.93
JUNE	57,555	2,303,333	40.02
JULY	54,645	2,116,066	38.72
AUGUST	58,365	2,109,240	36.14
SEPTEMBER	54,378	2,312,909	42.53
OCTOBER	48,976	2,027,626	41.40
NOVEMBER	43,654	1,817,438	41.63
DECEMBER	33,216	1,766,510	53.18
TOTAL	612,397	25,288,480	41.29

2006 PLANT KWH / TON YEAR-TO-DATE

MONTH	PRODUCTION SHORT TONS	KWH USED	2006 KWH USED PER TON
JANUARY	51,085	2,143,747	41.96
FEBRUARY	102,161	4,684,277	45.85
MARCH	157,166	6,809,554	43.33
APRIL	207,095	8,821,988	42.60
MAY	261,608	10,835,358	41.42
JUNE	319,163	13,138,691	41.17
JULY	373,808	15,254,757	40.81
AUGUST	432,173	17,363,997	40.18
SEPTEMBER	486,551	19,676,906	40.44
OCTOBER	535,527	21,704,532	40.53
NOVEMBER	579,181	23,521,970	40.61
DECEMBER	612,397	25,288,480	41.29
Metric	555,554	25,288,480	45.52

Omya California Inc.

2006 Sentinel KWH / TON BY MONTH

MONTH	PRODUCTION SHORT TONS	KWH USED	2006 KWH USED PER TON
JANUARY	24,726	12,208	0.49
FEBRUARY	30,852	12,636	0.41
MARCH	14,544	9,508	0.65
APRIL	17,394	6,405	0.37
MAY	25,818	9,732	0.38
JUNE	55,302	14,885	0.27
JULY	29,874	12,212	0.41
AUGUST	73,710	18,173	0.25
SEPTEMBER	66,846	18,247	0.27
OCTOBER	59,982	17,515	0.29
NOVEMBER	42,744	17,736	0.41
DECEMBER	16,980	18,173	1.07
TOTAL	458,772	167,430	0.36
Metric	416,189	167,430	0.40

Mojave Desert AQMD

14306 Park Avenue, Victorville, CA 92392-2310 (760) 245-1661

PERMIT TO OPERATE

B000751

Operation under this permit must be conducted in compliance with all information included with the initial application,initial permit condition, and conditions contained herein. The equipment must be maintained and kept in good operating condition at all times. This Permit to Operate or copy must be posted on or within 8 meters of equipment. If copy is posted, original must be maintained on site, available for inspection at all times.

EXPIRES LAST DAY OF: OCTOBER 2013

OWNER OR OPERATOR (0090)
Omya (California) Inc
7299 Crystal Creek Road
Lucerne Valley, CA 92356

EQUIPMENT LOCATION: (00461)
Omya - Main Plant
7299 Crystal Creek Road
Lucerne Valley, CA 92356

DESCRIPTION:

CRUSHING AND SCREENING CIRCUIT (SENTINEL) consisting of:

Capacity	Equipment Description
0.0	31-110 Feed Hopper
50.0	31-120 Vibrating Feeder
40.0	31-130 Primary Screen
200.0	31-140 Jaw Crusher
25.0	31-150 Conveyor-Crusher discharge
15.0	31-220 Conveyor-Reject
20.0	31-160 Conveyor-Picking Feed
25.0	31-180 Conveyor-Picking
20.0	31-190 Conveyor-Radial Stacker
5.0	31-191 Conveyor-Travel Motor
400.0	

CONDITIONS:

1. This equipment shall be operated and maintained in strict accord with the recommendations of the manufacturer and/or sound engineering practices consistent with minimal emissions.
2. This circuit shall not be operated unless the water spray equipment (C003293) and baghouse (C007808) are operating properly.

Fee Schedule: 1(C) Rating: 400.0 SIC: 1422 SCC: 99999999 Location/UTM(Km): 506E/3806N

This permit does not authorize the emission of air contaminants in excess of those allowed by law, including Division 26 of the Health and Safety Code of the State of California and the Rules and Regulations of the District. This permit cannot be construed as permission to violate existing laws, ordinances, statutes or regulations of this or other governmental agencies. This permit must be renewed by the expiration date above. If billing for renewal fee required by Rule 301(c) is not received by expiration date above, please contact the District.

Omya (California) Inc
7225 Crystal Creek Rd
Lucerne Valley, CA 92356

BY: [signature]

Eldon Heaston
Air Pollution Control Officer

DATE: 10/15/2012

CONDITIONS continued:

3. The maximum ore processed by this equipment shall not exceed 5000 ton/day and 600 ton/hour, verified on a monthly basis.

4. This equipment shall not discharge into the atmosphere an exhaust stream that exhibits greater than the following opacity:
   a. All transfer points and fugitive emission points - ten percent (40 CFR 60.672(b))

5. This equipment shall be operating in compliance with all applicable requirements of 40 CFR 60 Subpart OOO - Standards of Performance for Nonmetallic Mineral Processing Plants.

6. The o/o shall conduct a minimum program of inspection and maintenance on this equipment. The o/o shall maintain current and on-site for two (2) years a log of the following information, which shall be provided to District, State or Federal personnel upon request:
   a. Monthly production (in tons) and hours operated;
   b. Quarterly stack and transfer/fugitive emission point observation date and result (using USEPA Method 22, and USEPA Method 9 if necessary); and,
   c. Date and nature of any system repairs.

MOJAVE DESERT air quality management district

Mojave Desert AQMD

14306 Park Avenue, Victorville, CA 92392-2310 (760) 245-1661

PERMIT TO OPERATE

C003293

Operation under this permit must be conducted in compliance with all information included with the initial application,initial permit condition, and conditions contained herein. The equipment must be maintained and kept in good operating condition at all times. This Permit to Operate or copy must be posted on or within 8 meters of equipment. If copy is posted, original must be maintained on site, available for inspection at all times.

EXPIRES LAST DAY OF: OCTOBER 2013

OWNER OR OPERATOR (0090)

Omya (California) Inc
7299 Crystal Creek Road
Lucerne Valley, CA 92356

EQUIPMENT LOCATION: (00461)

Omya - Main Plant
7299 Crystal Creek Road
Lucerne Valley, CA 92356

DESCRIPTION:

WATER SPRAY-DUST SUPPRESSION SYSTEM (PUMP 31-230) consisting of:

a 150 gallon per hour system to spray dust from the Sentinel Quarry Crushing and Screening Circuit, under District permit B000751.

CONDITIONS:

1. This circuit shall be operated concurrently with the Sentinel Quarry Crushing and Screening Circuit under valid District permit B000751.
2. The points where dust suppression is applied shall be so chosen that particulate emissions from the handling, processing, and storing of ore, product and/or waste are sufficiently treated to comply with all applicable Rules and Regulations of this District, which are included in part in Regulations IV and XIII.
3. The owner/operator, o/o, shall operate and maintain this system in strict accord with the recommendations of the manufacturer/supplier and/or sound engineering principles which produce the minimum emissions of particulate matter.
4. The o/o shall log all maintenance, repairs, replacements on the equipment. The log shall be maintained current, on-site for a minimum of 2 years and provided to District personnel on request.

Fee Schedule: 7(h) Rating: 1.0 SIC: 1422 SCC: 99999999 Location/UTM(Km): 506E/3806N

This permit does not authorize the emission of air contaminants in excess of those allowed by law, including Division 26 of the Health and Safety Code of the State of California and the Rules and Regulations of the District. This permit cannot be construed as permission to violate existing laws, ordinances, statutes or regulations of this or other governmental agencies. This permit must be renewed by the expiration date above. If billing for renewal fee required by Rule 301(c) is not received by expiration date above, please contact the District.

Omya (California) Inc
7225 Crystal Creek Rd
Lucerne Valley, CA 92356

BY: [signature]
Eldon Heaston
Air Pollution Control Officer

DATE: 10/15/2012

Mojave Desert AQMD

14306 Park Avenue, Victorville, CA 92392-2310 (760) 245-1661

PERMIT TO OPERATE

C007808

Operation under this permit must be conducted in compliance with all information included with the initial application,initial permit condition, and conditions contained herein. The equipment must be maintained and kept in good operating condition at all times. This Permit to Operate or copy must be posted on or within 8 meters of equipment. If copy is posted, original must be maintained on site, available for inspection at all times.

EXPIRES LAST DAY OF: OCTOBER 2013

OWNER OR OPERATOR (0090)
Omya (California) Inc
7299 Crystal Creek Road
Lucerne Valley, CA 92356

EQUIPMENT LOCATION: (00461)
Omya - Main Plant
7299 Crystal Creek Road
Lucerne Valley, CA 92356

DESCRIPTION:

BAGHOUSE, SENTINEL CRUSHER SCREEN (31-131) consisting of:

a DCE Inc. CSI, type F, size 66k11 Sintamatic Insertable reverse jet collector. The total filtering area of the bags is 710 sq ft, and of self-supporting PTFE impregnated sintered polyethylene media. The effective filtration volume of 3000 ACFM is driven by a 10 hp motor. Ancillary equipment includes the necessary electric, controls, magnehelic, and acoustic diffusers for optimum service.

CONDITIONS:

1. The owner/operator (o/o) shall maintain this dust collector in strict accord with those recommendations of the manufacturer/supplier and/or sound engineering principles which produce the minimum emissions of air contaminants.

2. This baghouse shall operate concurrently with the Vibrating Feeder and the Primary Screen of the Sentinel Crusher Circuit under valid District permit B000751.

3. The o/o shall conduct a minimum program of inspection and maintenance on this equipment. The o/o shall maintain current and on-site for five (5) years a log of the following information, which shall be provided to District personnel upon request:
   a. Quarterly dust collector stack observation date and result (using USEPA Method 22, and USEPA Method 9 if necessary);
   b. Quarterly bag and bag suspension system inspection date and results;
   c. Quarterly reading of dust collector pressure drop, date and value (if a manometer is present);
   d. Date of bag replacements; and,
   e. Date and nature of any system repairs.

4. This dust collector shall not discharge into the atmosphere an exhaust stream that exhibits greater than seven percent opacity (40 CFR 60.672(a)(2)).

5. This dust collector shall discharge no more than 0.26 pounds per hour of PM10 at a maximum concentration of 0.01 grains/dscf at the operating conditions given in the above description (BACT). This equipment does not require a regularly scheduled emission compliance test. However, emission compliance testing may be required at the discretion of the District.

Fee Schedule: 7(h) Rating: 1.0 SIC: 1422 SCC: 99999999 Location/UTM(Km): 506E/3806N

This permit does not authorize the emission of air contaminants in excess of those allowed by law, including Division 26 of the Health and Safety Code of the State of California and the Rules and Regulations of the District. This permit cannot be construed as permission to violate existing laws, ordinances, statutes or regulations of this or other governmental agencies. This permit must be renewed by the expiration date above. If billing for renewal fee required by Rule 301(c) is not received by expiration date above, please contact the District.

Omya (California) Inc
7225 Crystal Creek Rd
Lucerne Valley, CA 92356

BY: [signature]
Eldon Heaston
Air Pollution Control Officer

DATE: 10/15/2012

Mojave Desert AQMD

14306 Park Avenue, Victorville, CA 92392-2310 (760) 245-1661

PERMIT TO OPERATE

B002456

Operation under this permit must be conducted in compliance with all information included with the initial application,initial permit condition, and conditions contained herein. The equipment must be maintained and kept in good operating condition at all times. This Permit to Operate or copy must be posted on or within 8 meters of equipment. If copy is posted, original must be maintained on site, available for inspection at all times.

EXPIRES LAST DAY OF: OCTOBER 2013

OWNER OR OPERATOR (0090)
Omya (California) Inc
7299 Crystal Creek Road
Lucerne Valley, CA 92356

EQUIPMENT LOCATION: (00461)
Omya - Main Plant
7299 Crystal Creek Road
Lucerne Valley, CA 92356

DESCRIPTION:

CRUSHING AND SCREENING CIRCUIT (WHITE KNOB) consisting of:

Capacity	Equipment Description	
25.0	51-003	Air Compressor
0.0	51-004	Truck Loading Hopper
50.0	51-005	Vibrating Feeder
250.0	51-006	Jaw Crusher
40.0		Triple Deck Grizzly Screen
15.0	51-007	Conveyor for Grizzly Fines
25.0	51-008	Conveyor, Under Crusher
10.0	51-009	Conveyor, Screen Feed
40.0	51-010	Triple Deck Screen
10.0	51-011	Conveyor, Under Screen
7.5	51-012	Conveyor, Sand Transfer
25.0	51-013	Conveyor, Sand Reject
10.0	51-014	Conveyor, Product
40.0	51-015	Conveyor, Radial Stacker
40.0	51-017	Rock Breaker
10.0	51-115	Travel Motor
597.5		

Fee Schedule: 1(C) Rating: 597.5 SIC: 1422 SCC: 99999999 Location/UTM(Km): 506E/3806N

This permit does not authorize the emission of air contaminants in excess of those allowed by law, including Division 26 of the Health and Safety Code of the State of California and the Rules and Regulations of the District. This permit cannot be construed as permission to violate existing laws, ordinances, statutes or regulations of this or other governmental agencies. This permit must be renewed by the expiration date above. If billing for renewal fee required by Rule 301(c) is not received by expiration date above, please contact the District.

Omya (California) Inc
7225 Crystal Creek Rd
Lucerne Valley, CA 92356

BY: [signature]
Eldon Heaston
Air Pollution Control Officer

DATE: 10/15/2012

ONDITIONS:

1. This equipment shall be operated and maintained in strict accord with the recommendations of the manufacturer and/or sound engineering practices consistent with minimal emissions.

2. This circuit shall not be operated unless the water spray equipment is operating under valid District permit C002458.

3. The maximum ore processed by this equipment shall not exceed 4000 ton/day and 400 ton/hour, verified on a monthly basis.

4. This equipment shall not discharge into the atmosphere an exhaust stream that exhibits greater than the following opacity:
   a. All transfer points and fugitive emission points - ten percent (40 CFR 60.672(b))

5. This equipment shall be operating in compliance with all applicable requirements of 40 CFR 60 Subpart OOO - Standards of Performance for Nonmetallic Mineral Processing Plants.

6. The o/o shall conduct a minimum program of inspection and maintenance on this equipment. The o/o shall maintain current and on-site for two (2) years a log of the following information, which shall be provided to District, State or Federal personnel upon request:
   a. Monthly production (in tons) and hours operated;
   b. Quarterly stack and transfer/fugitive emission point observation date and result (using USEPA Method 22, and USEPA Method 9 if necessary); and,
   c. Date and nature of any system repairs.

7. This equipment shall not operate while the equipment under District permits B0011000 and B011001 is operating.

MOJAVE air quality management district DESERT

Mojave Desert AQMD

14306 Park Avenue, Victorville, CA 92392-2310 (760) 245-1661

PERMIT TO OPERATE

C002458

Operation under this permit must be conducted in compliance with all information included with the initial application,initial permit condition, and conditions contained herein. The equipment must be maintained and kept in good operating condition at all times. This Permit to Operate or copy must be posted on or within 8 meters of equipment. If copy is posted, original must be maintained on site, available for inspection at all times.

EXPIRES LAST DAY OF: OCTOBER 2013

OWNER OR OPERATOR (0090)
Omya (California) Inc
7299 Crystal Creek Road
Lucerne Valley, CA 92356

EQUIPMENT LOCATION: (00461)
Omya - Main Plant
7299 Crystal Creek Road
Lucerne Valley, CA 92356

DESCRIPTION:

DUST SUPPRESSION-WATER SPRAY NO. 1 (WHITE KNOB) consisting of:

a water spray system rated at 150 gal/h of water at the White Knob Quarry crushing and screening circuit under District permit B002456.

CONDITIONS:

1. This circuit shall be operated concurrently with Crushing and Screening System under valid District permit B002456.
2. The points where dust suppression is applied shall be so chosen that particulate emissions from the handling, processing, and storing of ore, product and/or waste are sufficiently treated to comply with all applicable Rules and Regulations of this District, which are included in part in Regulations IV and XIII.
3. The owner/operator, o/o, shall operate and maintain this system in strict accord with the recommendations of the manufacturer/supplier and/or sound engineering principles which produce the minimum emissions of particulate matter.
4. The o/o shall log all maintenance, repairs, filter replacements on the equipment. The log shall be maintained current, on-site for a minimum of 2 years and provided to District personnel on request.

Fee Schedule: 7(h) Rating: 10.0 SIC: 1422 SCC: 99999999 Location/UTM(Km): 506E/3806N

This permit does not authorize the emission of air contaminants in excess of those allowed by law, including Division 26 of the Health and Safety Code of the State of California and the Rules and Regulations of the District. This permit cannot be construed as permission to violate existing laws, ordinances, statutes or regulations of this or other governmental agencies. This permit must be renewed by the expiration date above. If billing for renewal fee required by Rule 301(c) is not received by expiration date above, please contact the District.

Omya (California) Inc
7225 Crystal Creek Rd
Lucerne Valley, CA 92356

BY: [signature]
Eldon Heaston
Air Pollution Control Officer

DATE: 10/15/2012

Appendix H: Baseline Emissions Calculations

Location	Type	hp	HC (g/hp-hr)	HC det (g/hp-hr2)	HC FCF	NOx (g/hp-hr)	NOx det (g/hp-hr2)	NOx FCF	PM (g/hp-hr)	PM det (g/hp-hr2)	PM FCF
Pit	Dozer	370	0.68	0.0000237	0.72	8.17	0.000136	0.93	0.38	0.0000202	0.72
Pit	Excavator	195	0.68	0.0000315	0.72	8.17	0.000189	0.93	0.38	0.0000276	0.72
Pit	Loader	690	0.44	0.00002505	0.72	6.9375	0.0001088	0.939	0.2825	0.00001497	0.76
Plant	Bobcat	50									
Plant	Crane	150	1	0.0000463	0.72	12	0.000278	0.93	0.55	0.00004	0.72
Plant	Forklift	52									
Plant	Guzzler	322	0.19	0.0000195	0.72	4.95	0.0000734	0.948	0.12	0.00000651	0.8
Plant	Loader	305									
Plant	Manlift	150	0.68	0.0000315	0.72	6.9	0.00016	0.948	0.38	0.0000276	0.8
Plant	Sweeper	101									
Roads	Dump Truck	425									
Roads	Fuel Truck	370									
Roads	Grader	275	0.84	0.0000293	0.72	11	0.000183	0.93	0.53	0.0000281	0.72
Roads	Lube Truck	268.5									
Roads	Truck	896									
WKQ	Generator	890	0.68	0.00	0.72	8.17	0.00	0.93	0.38	0.00	0.72

Cells with information on units that were operated during the baseline years and then retired are filled with grey.

Location	CO (g/hp-hr)	CO det (g/hp-hr2)	HC EF (g/hp-hr)	NOx EF (g/hp-hr)	PM EF (g/hp-hr)	CO EF (g/hp-hr)	SO2 EF (g/hp-hr)	Load Factor
Pit	4.1	8.12E-04	0.67	8.95	0.43	12.78	0.00028	0.43
Pit	2.7	7.14E-05	0.71	9.28	0.46	3.38	0.00028	0.38
Pit	2.185	2.30E-04	0.52	7.67	0.34	4.94	0.00028	0.36
Plant			2.39	7.13	0.81	8.23	0.00028	0.37
Plant	4.4	1.16E-04	1.12	14.26	0.74	5.79	0.00028	0.2881
Plant			1.14	7.58	0.78	4.62	0.00028	0.20
Plant	0.92	1.82E-05	0.22	5.10	0.13	1.03	0.00028	0.34
Plant			0.81	10.99	0.57	9.86	0.00028	0.36
Plant	2.7	7.14E-05	0.57	7.11	0.39	2.97	0.00028	0.3082
Plant			0.99	10.30	0.78	4.94	0.00028	0.40
Roads			0.69	9.13	0.45	13.84	0.00028	0.34
Roads			0.69	9.12	0.45	13.84	0.00028	0.34
Roads	4.1	8.12E-04	0.86	12.27	0.62	13.84	0.00028	0.41
Roads			0.84	11.09	0.59	9.76	0.00028	0.34
Roads			0.35	6.53	0.20	4.10	0.00028	0.38
WKQ	4.1	8.12E-04	0.59	9.12	0.29	13.84	0.00028	0.525

Location	Average (hr)	Avg. (hp-hr)	HC (lb/yr)	NOx (lb/yr)	PM (lb/yr)	CO (lb/yr)	SOx (lb/yr)	CO2 (tpy)
Pit	120.0	44,393	28	376	18	536	0.012	26
Pit	293.7	57,265	34	447	22	163	0.013	33
Pit	5135.3	3,543,333	1,468	21,668	950	13,951	0.781	2,064
Plant	243.3	12,167	24	70	8	81	0.003	7
Plant	33.7	5,050	4	46	2	19	0.001	3
Plant	17066.8	887,473	447	2,981	308	1,816	0.109	517
Plant	0.0	0	-	-	-	-	-	-
Plant	233.7	71,287	46	625	32	561	0.016	42
Plant	29.0	4,350	2	21	1	9	0.001	3
Plant	699.5	70,650	62	640	48	307	0.017	41
Roads	389.2	165,430	87	1,137	56	1,725	0.034	96
Roads	68.9	25,500	13	175	9	266	0.005	15
Roads	612.3	168,392	130	1,862	95	2,101	0.042	98
Roads	347.4	93,270	59	780	42	685	0.019	54
Roads	18645.4	16,706,243	4,897	91,813	2,789	57,696	3.885	9,730
WKQ	952.0	847,280	575	8,940	285	13,576	0.271	493
	Pit Subtotal	3,644,992	1,531	22,491	990	14,650	0.806	2,123
	Plant Subtotal	1,041,576	578	4,316	396	2,765	0.144	607
	Roads Subtotal	17,158,834	5,186	95,767	2,990	62,474	3.987	9,994
	Total w/o Generator	21,845,402	7,294	122,573	4,377	79,888	4.936	12,723
	Total w/ Generator	22,692,682	7,869	131,513	4,663	93,464	5.207	13,217

Type	hp	Engine Year	HC (g/hp-hr)	HC det (g/hp-hr2)	HC FCF	NOx (g/hp-hr)	NOx det (g/hp-hr2)	NOx FCF	PM (g/hp-hr)	PM det (g/hp-hr2)	PM FCF	CO (g/hp-hr)	CO det (g/hp-hr2)
Dozer	250	1977	0.95	0.0000331	0.72	12	0.0002	0.93	0.53	0.0000281	0.72	4.4	0.000116
Dozer	370	1990	0.68	0.0000237	0.72	8.17	0.000136	0.93	0.38	0.0000202	0.72	4.1	0.000812
Dozer Total													
Excavator	195	1995	0.68	0.0000315	0.72	8.17	0.000189	0.93	0.38	0.0000276	0.72	2.7	0.0000714
Excavator Total													
Loader	690	2004	0.12	0.0000236	0.72	4.29	0.0000581	0.948	0.11	0.00000579	0.8	0.92	0.0000182
Loader	690	2004	0.12	0.0000236	0.72	4.29	0.0000581	0.948	0.11	0.00000579	0.8	0.92	0.0000182
Loader	690	1985	0.84	0.0000293	0.72	11	0.000183	0.93	0.53	0.0000281	0.72	4.2	0.000832
Loader	690	1995	0.68	0.0000237	0.72	8.17	0.000136	0.93	0.38	0.0000202	0.72	2.7	0.0000535
Loader	690	1994	0.68	0.0000237	0.72	8.17	0.000136	0.93	0.38	0.0000202	0.72	2.7	0.0000535
Loader	500	1985	0.84	0.0000293	0.72	11	0.000183	0.93	0.53	0.0000281	0.72	4.2	0.000832
Loader Total													
Bobcat	50	1983	1.84	0.000235	0.72	7	0.000105	0.93	0.76	0.0000589	0.72	5	0.000513
Bobcat	50	1983	1.84	0.000235	0.72	7	0.000105	0.93	0.76	0.0000589	0.72	5	0.000513
Bobcat	50	1987	1.84	0.000235	0.72	7	0.000105	0.93	0.76	0.0000589	0.72	5	0.000513
Bobcat	50	2001	1.45	0.000185	0.72	5.55	0.000103	0.948	0.6	0.0000465	0.8	5	0.000513
Bobcat Total													
Crane	150	1977	1	0.0000463	0.72	12	0.000278	0.93	0.55	0.00004	0.72	4.4	0.000116
Crane Total													
Forklift	52	1992	0.99	0.0000458	0.72	8.75	0.000202	0.93	0.69	0.0000502	0.72	4.8	0.000127
Forklift	52	2000	0.99	0.0000458	0.72	6.9	0.00016	0.948	0.69	0.0000502	0.8	3.49	0.0000923
Forklift	47	2001	1.45	0.000185	0.72	5.55	0.000103	0.948	0.6	0.0000465	0.8	3.49	0.0000923
Forklift	52	2003	0.99	0.0000458	0.72	6.9	0.00016	0.948	0.69	0.0000502	0.8	3.49	0.0000923
Forklift	57	2004	0.46	0.0000333	0.72	5.64	0.000103	0.948	0.39	0.0000285	0.8	3.49	0.0000923
Forklift	50	1986	1.84	0.000235	0.72	7	0.000105	0.93	0.76	0.0000589	0.72	5	0.000513
Forklift	50	1989	1.8	0.00023	0.72	6.9	0.000104	0.93	0.76	0.0000589	0.72	5	0.000513
Forklift	50	1990	1.8	0.00023	0.72	6.9	0.000104	0.93	0.76	0.0000589	0.72	5	0.000513
Forklift	50	1992	1.8	0.00023	0.72	6.9	0.000104	0.93	0.76	0.0000589	0.72	5	0.000513
Forklift	50	1993	1.8	0.00023	0.72	6.9	0.000104	0.93	0.76	0.0000589	0.72	5	0.000513
Forklift	50	1994	1.8	0.00023	0.72	6.9	0.000104	0.93	0.76	0.0000589	0.72	5	0.000513
Forklift	50	1994	1.8	0.00023	0.72	6.9	0.000104	0.93	0.76	0.0000589	0.72	5	0.000513
Forklift	50	1996	1.8	0.00023	0.72	6.9	0.000104	0.93	0.76	0.0000589	0.72	5	0.000513
Forklift	50	1997	1.8	0.00023	0.72	6.9	0.000104	0.93	0.76	0.0000589	0.72	5	0.000513
Forklift	50	1998	1.8	0.00023	0.72	6.9	0.000104	0.93	0.76	0.0000589	0.72	5	0.000513
Forklift Total													
Guzzler	322	2001	0.19	0.0000195	0.72	4.95	0.0000734	0.948	0.12	0.00000651	0.8	0.92	0.0000182
Guzzler Total													
Loader	375	1985	0.84	0.0000293	0.72	11	0.000183	0.93	0.53	0.0000281	0.72	4.2	0.000832
Loader	235	1992	0.68	0.0000315	0.72	8.17	0.000189	0.93	0.38	0.0000276	0.72	4.2	0.000111
Loader Total													
Manlift	150	1999	0.68	0.0000315	0.72	6.9	0.00016	0.948	0.38	0.0000276	0.8	2.7	0.0000714
Manlift Total													
Sweeper	150	1983	0.94	0.0000435	0.72	11	0.000254	0.93	0.55	0.00004	0.72	4.4	0.000116
Sweeper	150	1992	0.68	0.0000315	0.72	8.17	0.000189	0.93	0.38	0.0000276	0.72	4.2	0.000111
Sweeper	150	2002	0.68	0.0000315	0.72	6.9	0.00016	0.948	0.38	0.0000276	0.8	2.7	0.0000714
Sweeper	52	2003	0.99	0.0000458	0.72	6.9	0.00016	0.948	0.69	0.0000502	0.8	3.49	0.0000923
Sweeper Total													
Dump Truck	300	1988	0.68	0.0000237	0.72	8.17	0.000136	0.93	0.38	0.0000202	0.72	4.1	0.000812
Dump Truck	425	1989	0.68	0.0000237	0.72	8.18	0.000136	0.93	0.38	0.0000202	0.72	4.1	0.000812
Dump Truck Total													
Fuel Truck	300	1973	0.95	0.0000331	0.72	12	0.0002	0.93	0.53	0.0000281	0.72	4.2	0.000832
Fuel Truck	370	1994	0.68	0.0000237	0.72	8.17	0.000136	0.93	0.38	0.0000202	0.72	4.1	0.000812
Fuel Truck Total													
Grader	275	1987	0.84	0.0000293	0.72	11	0.000183	0.93	0.53	0.0000281	0.72	4.1	0.000812
Grader Total													
Lube Truck	300	1969	1.26	0.0000439	0.72	14	0.000233	0.93	0.74	0.0000393	0.72	4.2	0.000832
Lube Truck	215	1985	0.88	0.0000407	0.72	11	0.000254	0.93	0.55	0.00004	0.72	4.3	0.000114
Lube Truck	322	1988	0.68	0.0000237	0.72	8.18	0.000136	0.93	0.38	0.0000202	0.72	4.1	0.000812
Lube Truck	300	1987	0.84	0.0000293	0.72	11	0.000183	0.93	0.53	0.0000281	0.72	4.1	0.000812
Lube Truck Total													
Truck	1050	1991	0.68	0.0000112	0.72	8.17	0.000136	0.93	0.38	0.00000202	0.72	4.1	0.000812
Truck	635	2006	0.1	0.000025	0.72	2.45	0.0000318	0.948	0.11	0.00000555	0.8	0.92	0.0000182
Truck	938	2000	0.32	0.0000112	0.72	6.25	0.000104	0.948	0.15	0.00000796	0.8	2.7	0.0000535
Truck	1050	1982	0.9	0.0000314	0.72	11	0.000183	0.93	0.53	0.0000281	0.72	4.2	0.000832
Truck	1050	2002	0.32	0.0000112	0.72	6.25	0.000104	0.948	0.15	0.00000796	0.8	2.7	0.0000535
Truck	635	2004	0.12	0.0000236	0.72	4.29	0.0000581	0.948	0.11	0.00000579	0.8	0.92	0.0000182
Truck	1050	2004	0.32	0.0000112	0.72	6.25	0.000104	0.948	0.15	0.00000796	0.8	2.7	0.0000535
Truck	1050	2004	0.32	0.0000112	0.72	6.25	0.000104	0.948	0.15	0.00000796	0.8	2.7	0.0000535
Truck	1050	1997	0.68	0.0000112	0.72	8.17	0.000136	0.948	0.38	0.00000202	0.8	4.1	0.000812
Truck	760	2000	0.32	0.0000112	0.72	6.25	0.000104	0.948	0.15	0.00000796	0.8	2.7	0.0000535
Truck	635	1992	0.68	0.0000237	0.72	8.17	0.000136	0.93	0.38	0.0000202	0.72	4.1	0.000812
Truck	635	1990	0.68	0.0000237	0.72	8.17	0.000136	0.93	0.38	0.0000202	0.72	4.1	0.000812
Truck Total													
Generator	890	1992	0.68	0.0000112	0.72	8.17	0.000136	0.93	0.38	0.00000202	0.72	4.1	0.000812
Generator Total													
Grand Total													

Type	hp	Years in Service (2005)	Cumulative Hours (2005)	HC EF (g/hp-hr)	NOx EF (g/hp-hr)	PM EF (g/hp-hr)	CO EF (g/hp-hr)	SO2 EF (g/hp-hr)	Load Factor	2006 (hr)	2005 (hr)	2004 (hr)	Average (hr)	Avg. (hp-hr)
Dozer	250	28	11,874	0.966972	13.36849	0.621827	5.777341	0.000276	0.4288	31.00	14.00	23.00	23	5,667
Dozer	370	15	8,465	0.634042	8.668719	0.396711	10.97336	0.000276	0.4288	30.00	66.00	218.00	105	38,727
Dozer Total													127	44,393
Excavator	195	10	7,000	0.648359	8.828479	0.412703	3.199796	0.000276	0.3819	278.00	342.00	261.00	294	57,265
Excavator Total													294	57,265
Loader	690	1	2,612	0.130779	4.210774	0.100098	0.967534	0.000276	0.3618	998.00	870.00	554.00	807	557,060
Loader	690	1	2,612	0.130779	4.210774	0.100098	0.967534	0.000276	0.3618	796.00	715.00	612.00	708	488,290
Loader	690	20	12,000	0.857952	12.27228	0.624384	14.184	0.000276	0.3618	1,535.00	834.00	639.00	1,003	691,840
Loader	690	10	12,000	0.694368	9.11586	0.448128	3.342	0.000276	0.3618	1,225.00	1,450.00	1,392.00	1,356	935,410
Loader	690	11	12,000	0.694368	9.11586	0.448128	3.342	0.000276	0.3618	1,107.00	1,373.00	1,300.00	1,260	869,400
Loader	500	20	12,000	0.857952	12.27228	0.624384	14.184	0.000276	0.3618	-	7.00	1.00	3	1,333
Loader Total													5,136	3,543,333
Bobcat	50	22	5,296	2.220908	7.027169	0.771799	7.716924	0.000276	0.3685	184	109	110	134	6,717
Bobcat	50	22	5,296	2.220908	7.027169	0.771799	7.716924	0.000276	0.3685	177	82	51	103	5,167
Bobcat	50	18	4,724	2.124032	6.971259	0.747518	7.423202	0.000276	0.3685	0	0	0	0	0
Bobcat	50	4	1,927	1.300659	5.449548	0.55168	5.988486	0.000276	0.3685	17	0	0	6	283
Bobcat Total													243	12,167
Crane	150	28	12,000	1.120032	14.26248	0.7416	5.792	0.000276	0.2881	-	55.00	46.00	34	5,050
Crane Total													34	5,050
Forklift	52	13	9,655	1.031175	9.95124	0.845761	6.026152	0.000276	0.201	129.00	73.00	129.00	110	5,737
Forklift	52	5	4,138	0.849246	7.168813	0.718172	3.871914	0.000276	0.201	1,975.00	2,279.00	2,955.00	2,403	124,956
Forklift	47	4	3,448	1.50329	5.598088	0.60827	3.808262	0.000276	0.201	3,775.00	3,294.00	3,913.00	3,661	172,051
Forklift	52	2	2,069	0.781023	6.855007	0.635086	3.680957	0.000276	0.201	4,316.00	4,138.00	4,998.90	4,484	233,184
Forklift	57	1	1,379	0.364269	5.481395	0.343447	3.617305	0.000276	0.201	2,693.00	2,192.00	1,387.00	2,091	119,168
Forklift	50	19	12,000	3.3552	7.6818	1.056096	11.156	0.000276	0.201	-	124.00	91.00	72	3,583
Forklift	50	16	11,724	3.237431	7.550908	1.044375	11.01421	0.000276	0.201	78.00	55.00	105.00	79	3,967
Forklift	50	15	11,034	3.123229	7.484208	1.01513	10.66044	0.000276	0.201	-	-	126.00	42	2,100
Forklift	50	13	9,655	2.894825	7.350807	0.956638	9.952883	0.000276	0.201	-	-	-	0	0
Forklift	50	12	8,965	2.780624	7.284106	0.927393	9.599106	0.000276	0.201	-	15.00	244.00	86	4,317
Forklift	50	11	8,275	2.666422	7.217406	0.898147	9.245328	0.000276	0.201	348.00	351.00	650.00	450	22,483
Forklift	50	11	8,275	2.666422	7.217406	0.898147	9.245328	0.000276	0.201	564.00	242.00	207.00	338	16,883
Forklift	50	9	6,896	2.438018	7.084005	0.839656	8.537774	0.000276	0.201	1,127.00	1,337.00	1,008.60	1,158	57,877
Forklift	50	8	6,207	2.323816	7.017304	0.81041	8.183996	0.000276	0.201	1,594.00	1,010.00	225.60	943	47,160
Forklift	50	7	5,517	2.209614	6.950604	0.781165	7.830219	0.000276	0.201	1,312.00	1,683.00	1,445.40	1,480	74,007
Forklift Total													17,397	887,473
Guzzler	322	4	3,000	0.17892	4.90135	0.111624	0.9746	0.000276	0.3417	-	-	-	0	0
Guzzler Total													0	0
Loader	375	20	12,000	0.857952	12.27228	0.624384	14.184	0.000276	0.3618	84.00	-	-	28	10,500
Loader	235	13	12,000	0.76176	9.70734	0.512064	5.532	0.000276	0.3618	239.00	278.00	259.00	259	60,787
Loader Total													287	71,287
Manlift	150	6	1,861	0.531805	6.823462	0.345089	2.832869	0.000276	0.3082	87.00	-	-	29	4,350
Manlift Total													29	4,350
Sweeper	150	22	12,000	1.05264	13.06464	0.7416	5.792	0.000276	0.4556	-	-	1.00	0	50
Sweeper	150	13	9,184	0.697896	9.212396	0.456107	5.21944	0.000276	0.4556	-	6.00	67.00	24	3,650
Sweeper	150	3	2,624	0.549113	6.939214	0.361939	2.887356	0.000276	0.4556	227.00	911.00	201.00	446	66,950
Sweeper	52	2	1,500	0.762264	6.76872	0.61224	3.62845	0.000276	0.3417	-	-	-	0	0
Sweeper Total													471	70,650
Dump Truck	300	17	12,000	0.694368	9.11586	0.448128	13.844	0.000276	0.3819	785.10	731.70	137.50	551	165,430
Dump Truck	425	16	12,000	0.694368	9.12516	0.448128	13.844	0.000276	0.3417	-	-	-	0	0
Dump Truck Total													551	165,430
Fuel Truck	300	32	12,000	0.969984	13.392	0.624384	14.184	0.000276	0.3819	82.00	108.00	65.00	85	25,500
Fuel Truck	370	11	12,000	0.694368	9.11586	0.448128	13.844	0.000276	0.3417	-	-	-	0	0
Fuel Truck Total													85	25,500
Grader	275	18	12,000	0.857952	12.27228	0.624384	13.844	0.000276	0.4087	537.00	725.00	575.00	612	168,392
Grader Total													612	168,392
Lube Truck	300	36	12,000	1.286496	15.62028	0.872352	14.184	0.000276	0.3819	25.00	27.00	31.70	28	8,370
Lube Truck	215	20	12,000	0.985248	13.06464	0.7416	5.668	0.000276	0.3417	-	-	-	0	0
Lube Truck	322	17	12,000	0.694368	9.12516	0.448128	13.844	0.000276	0.3417	-	-	-	0	0
Lube Truck	300	18	12,000	0.857952	12.27228	0.624384	13.844	0.000276	0.3819	199.00	330.00	320.00	283	84,900
Lube Truck Total													311	93,270
Truck	1050	14	12,000	0.586368	9.11586	0.291053	13.844	0.000276	0.3819	1,310.00	1,220.00	1,386.00	1,305	1,370,600
Truck	635	-1	1,770	0.103858	2.375956	0.095858	0.952212	0.000276	0.3819	739.00	600.00	477.00	605	384,387
Truck	938	5	9,724	0.308817	6.883745	0.181925	3.220254	0.000276	0.3819	-	-	-	0	0
Truck	1050	23	12,000	0.919296	12.27228	0.624384	14.184	0.000276	0.3819	2,435.00	2,472.00	2,367.00	2,425	2,545,900
Truck	1050	3	6,722	0.284603	6.587696	0.162803	3.059606	0.000276	0.3819	2,466.00	2,914.00	2,666.00	2,682	2,816,100
Truck	635	1	3,480	0.145535	4.258602	0.10412	0.983339	0.000276	0.3819	597.00	1,123.00	471.00	730	463,762
Truck	1050	1	3,480	0.258464	6.268115	0.142162	2.886188	0.000276	0.3819	2,380.00	2,837.00	2,059.00	2,425	2,546,600
Truck	1050	1	3,480	0.258464	6.268115	0.142162	2.886188	0.000276	0.3819	2,549.00	3,281.00	2,357.00	2,729	2,865,450
Truck	1050	8	12,000	0.586368	9.292296	0.323392	13.844	0.000276	0.3819	2,768.00	1,715.00	1,334.00	1,939	2,035,950
Truck	760	5	9,724	0.308817	6.883745	0.181925	3.220254	0.000276	0.3819	1,143.00	629.00	510.80	761	578,309
Truck	635	13	12,000	0.694368	9.11586	0.448128	13.844	0.000276	0.3819	984.00	1,186.00	904.00	1,025	650,663
Truck	635	15	12,000	0.694368	9.11586	0.448128	13.844	0.000276	0.3819	638.00	1,063.00	418.00	706	448,522
Truck Total													17,333	16,706,243
Generator	890	13	12,000	0.586368	9.11586	0.291053	13.844	0.000276	0.525	499.00	470.00	1,887.00	952	847,280
Generator Total													952	847,280
Grand Total													43,862	22,702,082

Type	hp	HC (lb/yr)	NOx (lb/yr)	PM (lb/yr)	CO (lb/yr)	SOx (lb/yr)	CO2 (tpy)	HC (g/hp-hr)	NOx (g/hp-hr)	PM (g/hp-hr)	CO (g/hp-hr)	SOx (g/hp-hr)	Avg. HP	Diesel (gal/yr)
Dozer	250	5.18	71.61	3.33	30.95	0.001								
Dozer	370	23.21	317.36	14.52	401.74	0.010								
Dozer Total		28	389	18	433	0.012	25.86	0.29	3.97	0.18	4.42	0.00	349	2,311
Excavator	195	31.26	425.66	19.90	154.28	0.013								
Excavator Total		31	426	20	154	0.013	33.35	0.25	3.37	0.16	1.22	0.00	195	2,981
Loader	690	58.11	1,870.98	44.48	429.91	0.123								
Loader	690	50.94	1,640.00	38.99	376.83	0.108								
Loader	690	473.45	6,772.30	344.56	7,827.25	0.152								
Loader	690	518.08	6,801.50	334.36	2,493.52	0.206								
Loader	690	481.52	6,321.53	310.76	2,317.56	0.192								
Loader	500	0.91	13.05	0.66	15.08	0.000								
Loader Total		1,583	23,419	1,074	13,460	0.781	2,063.74	0.20	3.00	0.14	1.72	0.00	690	184,454
Bobcat	50	12.1	38.3	4.2	42.1	0.002								
Bobcat	50	9.3	29.5	3.2	32.4	0.001								
Bobcat	50	0.0	0.0	0.0	0.0	-								
Bobcat	50	0.30	1.25	0.13	1.38	0.000								
Bobcat Total		22	69	8	76	0.003	7.09	0.81	2.58	0.28	2.83	0.00	50	633
Crane	150	3.59	45.75	2.38	18.58	0.001								
Crane Total		4	46	2	19	0.001	2.94	0.32	4.11	0.21	1.67	0.00	150	263
Forklift	52	2.62	25.30	2.15	15.32	0.001								
Forklift	52	47.02	396.95	39.77	214.40	0.015								
Forklift	47	114.61	426.81	46.38	290.35	0.021								
Forklift	52	80.70	708.33	65.62	380.36	0.029								
Forklift	57	19.24	289.46	18.14	191.02	0.015								
Forklift	50	5.33	12.20	1.68	17.71	0.000								
Forklift	50	5.69	13.27	1.84	19.36	0.000								
Forklift	50	2.91	6.96	0.94	9.92	0.000								
Forklift	50	-	-	-	-	-								
Forklift	50	5.32	13.93	1.77	18.36	0.001								
Forklift	50	26.57	71.91	8.95	92.11	0.003								
Forklift	50	19.95	54.00	6.72	69.17	0.002								
Forklift	50	62.53	181.68	21.53	218.97	0.007								
Forklift	50	48.56	146.65	16.94	171.03	0.006								
Forklift	50	72.46	227.94	25.62	256.79	0.009								
Forklift Total		514	2,575	258	1,965	0.109	516.89	0.26	1.32	0.13	1.00	0.00	51	46,199
Guzzler	322	-	-	-	-	-								
Guzzler Total		-	-	-	-	-	-	-	-	-	-	-	-	-
Loader	375	7.19	102.78	5.23	118.79	0.002								
Loader	235	36.93	470.67	24.83	268.22	0.013								
Loader Total		44	573	30	387	0.016	41.52	0.28	3.65	0.19	2.46	0.00	249	3,711
Manlift	150	1.57	20.17	1.02	8.37	0.001								
Manlift Total		2	20	1	8	0.001	2.53	0.16	2.10	0.11	0.87	0.00	150	226
Sweeper	150	0.05	0.66	0.04	0.29	0.000								
Sweeper	150	2.56	33.77	1.67	19.14	0.001								
Sweeper	150	36.93	466.64	24.34	194.17	0.019								
Sweeper	52	-	-	-	-	-								
Sweeper Total		40	501	26	214	0.020	41.15	0.25	3.22	0.17	1.37	0.00	150	3,678
Dump Truck	300	96.71	1,269.69	62.42	1,928.24	0.038								
Dump Truck	425	-	-	-	-	-								
Dump Truck Total		97	1,270	62	1,928	0.038	96.35	0.27	3.48	0.17	5.29	0.00	300	8,612
Fuel Truck	300	20.83	287.52	13.41	304.53	0.006								
Fuel Truck	370	-	-	-	-	-								
Fuel Truck Total		21	288	13	305	0.006	14.85	0.37	5.11	0.24	5.42	0.00	300	1,327
Grader	275	130.17	1,862.03	94.74	2,100.50	0.042								
Grader Total		130	1,862	95	2,101	0.042	98.08	0.35	5.02	0.26	5.66	0.00	275	8,766
Lube Truck	300	9.07	110.08	6.15	99.96	0.002								
Lube Truck	215	-	-	-	-	-								
Lube Truck	322	-	-	-	-	-								
Lube Truck	300	61.33	877.24	44.63	989.59	0.020								
Lube Truck Total		70	987	51	1,090	0.022	54.32	0.34	4.80	0.25	5.30	0.00	300	4,855
Truck	1050	676.65	10,519.49	335.87	15,975.65	0.32								
Truck	635	33.61	768.94	31.02	308.17	0.09								
Truck	938	-	-	-	-	-								
Truck	1050	1,970.53	26,305.88	1,338.38	30,403.69	0.59								
Truck	1050	674.80	15,619.52	386.01	7,254.37	0.65								
Truck	635	56.83	1,662.83	40.66	383.96	0.11								
Truck	1050	554.17	13,439.52	304.81	6,188.30	0.59								
Truck	1050	623.56	15,122.23	342.97	6,963.12	0.67								
Truck	1050	1,005.13	15,928.55	554.35	23,730.94	0.47								
Truck	760	150.37	3,351.75	88.58	1,567.97	0.13								
Truck	635	380.39	4,993.90	245.50	7,584.10	0.15								
Truck	635	262.22	3,442.45	169.23	5,227.95	0.10								
Truck Total		6,388	111,155	3,837	105,588	3.89	9,730.20	0.17	3.02	0.10	2.87	0.00	964	869,672
Generator	890	575.03	8,939.65	285.43	13,576.39	0.27								
Generator Total		575	8,940	285	13,576	0.27	493.48	0.31	4.79	0.15	7.27	0.00	890	44,107
Grand Total		9,548	152,520	5,781	141,303	5.22	13,222.35	0.19	3.05	0.12	2.82	0.00	518	1,181,796

Ore to Primary Crusher											MAX	AVG - ALL YEARS	**Baseline (tons)**	**Peak Day (tons)**	**Peak Hour (tons)**
USDT	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011					
Sentinel	325,951	377,760	386,835	467,520	309,880	237,946	189,453	154,967	280,363	210,316	467,520	294,099	388,078	4,361	523
Butterfield 3	0	0	0	41,701	128,948	97,601	80,575	50,018	47,628	48,972	128,948	49,544	56,883	639	77
White Knob	261,244	274,193	309,168	311,999	350,895	212,999	190,274	52,758	228,414	144,075	350,895	233,602	324,021	4,000	400
Annex			0	0	0	0	0	0	0	0	0	0	0	0	0
White Ridge			0	0	0	0	0	0	0	0	0	0	0	0	0
Sentinel - Butterfield	325,951	377,760	386,835	509,221	438,828	335,547	270,028	204,985	327,991	259,288	596,468	343,643	444,962	5,000	600
TOTAL	587,194	651,953	696,004	821,220	789,724	548,546	460,302	257,742	556,405	403,363	947,364	577,245	768,982	9,000	1,000
Ore Hauled to Plant															
USDT	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011					
Sentinel	277,058	321,096	328,810	397,392	263,398	202,254	161,035	131,722	238,309	178,768	397,392	249,984	329,867	3,707	445
Butterfield 3	0	0	0	35,446	109,606	82,961	68,489	42,515	40,483	41,627	109,606	42,113	48,351	543	65
White Knob	222,057	233,064	262,793	265,199	298,261	181,049	161,733	44,844	194,152	122,463	298,261	198,562	275,418	3,400	340
Annex			0	0	0	0	0	0	0	0	0	0	0	0	0
White Ridge			0	0	0	0	0	0	0	0	0	0	0	0	0
Sentinel - Butterfield	277,058	321,096	328,810	432,838	373,004	285,215	229,524	174,237	278,792	220,395	506,998	292,097	378,217	4,250	510
TOTAL	499,115	554,160	591,603	698,037	671,265	466,264	391,257	219,081	472,944	342,858	805,259	490,658	653,635	7,650	850
Waste Total															
USDT	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011					
Sentinel	178,260	171,504	204,702	184,440	207,780	203,074	165,940	109,181	305,832	782,285	782,285	251,300	198,974	2,461	295
Butterfield 3	0	0	0	59,376	81,624	185,546	34,820	15,256	85,687	116,028	185,546	57,834	47,000	361	43
White Knob	164,666	159,728	151,860	281,698	130,590	169,776	61,020	1,250	85,766	103,348	281,698	130,970	188,049	2,258	226
Annex			0	0	0	0	0	0	0	0	0	0	0	0	0
White Ridge			0	0	0	0	0	0	0	0	0	0	0	0	0
Sentinel - Butterfield	178,260	171,504	204,702	243,816	289,404	388,620	200,760	124,437	391,519	898,313	967,831	309,133	245,974	2,822	339
TOTAL	342,926	331,232	356,562	525,514	419,994	558,396	261,780	125,687	477,285	1,001,661	1,249,529	440,104	434,023	5,080	564
Waste Crusher Fines															
USDT	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011					
Sentinel	48,893	56,664	58,025	70,128	46,482	35,692	28,418	23,245	42,054	31,547	70,128	44,115	58,212	654	78
Butterfield 3	0	0	0	6,255	19,342	14,640	12,086	7,503	7,144	7,346	19,342	7,432	8,532	96	12
White Knob	39,187	41,129	46,375	46,800	52,634	31,950	28,541	7,914	34,262	21,611	52,634	35,040	48,603	600	60
Annex			0	0	0	0	0	0	0	0	0	0	0	0	0
White Ridge			0	0	0	0	0	0	0	0	0	0	0	0	0
Sentinel - Butterfield	48,893	56,664	58,025	76,383	65,824	50,332	40,504	30,748	49,199	38,893	89,470	51,547	66,744	750	90
TOTAL	88,079	97,793	104,401	123,183	118,459	82,282	69,045	38,661	83,461	60,504	142,105	86,587	115,347	1,350	150
Waste Rock Not Processed															
USDT	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011					
Sentinel	129,367	114,840	146,677	114,312	161,298	167,382	137,522	85,936	263,777	750,737	750,737	207,185	140,762	1,807	217
Butterfield 3	0	0	0	53,121	62,282	170,906	22,734	7,753	78,543	108,682	170,906	50,402	38,468	265	32
White Knob	125,479	118,599	105,485	234,898	77,956	137,826	32,479	(6,664)	51,504	81,737	234,898	95,930	139,446	1,658	166
Annex			0	0	0	0	0	0	0	0	0	0	0	0	0
White Ridge			0	0	0	0	0	0	0	0	0	0	0	0	0
Sentinel - Butterfield	129,367	114,840	146,677	167,433	223,580	338,288	160,256	93,689	342,320	859,420	921,643	257,587	179,230	2,072	249
TOTAL	254,847	233,439	252,161	402,331	301,535	476,114	192,735	87,026	393,824	941,157	1,156,541	353,517	318,676	3,730	414
SUBTOTAL SENTINEL-B	455,318	492,600	533,512	676,654	662,408	673,835	430,284	298,674	670,311	1,118,708	1,518,111	601,230	624,191	7,072	849
L EXCAVATED (TONS):	842,041	885,392	948,165	1,223,551	1,091,259	1,024,660	653,037	344,768	950,230	1,344,520	2,103,905	930,762	1,087,658	12,730	1,414

					A - Butterfield Pit	B - Waste Pile	C - West Road	D - Butterfield Crusher	E - Sentinel Pit	F - Crushed Pile	G - Sentinel/ Butterfield to Plant	H - White Ridge to Plant	I - Plant Feed	J - White Knob Pit	K - On-Road Trucks	L - Crusher to White Ridge	M - White Ridge Pit
					A	B	C	D	E	F	G	H	I	J	K	L	M
Ore to Primary Crushe	**Trips/Year**	**Trips/Day**	**Trips/Hour**	**Unpaved Road Links Traveled**	3,360	775	1,015	-	3,000	-	38,000	24,260	365	3,725	6,186	2300	1300
USDT																	
Sentinel	10,349	116	14	E	-	-	-	-	5,880	-	-	-	-	-	-	-	-
Butterfield 3	1,517	17	2	A, C	965	-	292	-	-	-	-	-	-	-	-	-	-
White Knob	8,641	107	11	J	-	-	-	-	-	-	-	-	-	6,096	-	-	-
Annex	0	0	0	J	-	-	-	-	-	-	-	-	-	-	-	-	-
White Ridge	0	0	0	M, L	-	-	-	-	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	11,866	133	16														
TOTAL	20,506	240	27														
Ore Hauled to Plant																	
USDT																	
Sentinel	8,796	99	12	G, I	-	-	-	-	-	-	63,308	-	608	-	-	-	-
Butterfield 3	1,289	14	2	G, I	-	-	-	-	-	-	9,279	-	89	-	-	-	-
White Knob	7,344	91	9	H, L, I	-	-	-	-	-	-	-	33,746	508	-	-	3,199	-
Annex	0	0	0	H, L, I	-	-	-	-	-	-	-	-	-	-	-	-	-
White Ridge	0	0	0	H, L, I	-	-	-	-	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	10,086	113	14														
TOTAL	17,430	204	23												20,421		
Waste Total																	
USDT																	
Sentinel	5,306	66	8														
Butterfield 3	1,253	10	1														
White Knob	5,015	60	6														
Annex	0	0	0														
White Ridge	0	0	0														
Sentinel - Butterfield	6,559	75	9														
TOTAL	11,574	135	15														
Waste Crusher Fines																	
USDT																	
Sentinel	1,552	17	2	B, C	-	228	298	-	-	-	-	-	-	-	-	-	-
Butterfield 3	228	3	0	B, C	-	33	44	-	-	-	-	-	-	-	-	-	-
White Knob	1,296	16	2	L	-	-	-	-	-	-	-	-	-	-	-	565	-
Annex	0	0	0	L	-	-	-	-	-	-	-	-	-	-	-	-	-
White Ridge	0	0	0	L	-	-	-	-	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	1,780	20	2														
TOTAL	3,076	36	4														
Waste Rock Not Proce																	
USDT																	
Sentinel	3,754	48	6	B, C, E	-	551	722	-	2,133	-	-	-	-	-	-	-	-
Butterfield 3	1,026	7	1	A, B	653	151	-	-	-	-	-	-	-	-	-	-	-
White Knob	3,719	44	4	J, L	-	-	-	-	-	-	-	-	-	2,623	-	1,620	-
Annex	0	0	0	J, L	-	-	-	-	-	-	-	-	-	-	-	-	-
White Ridge	0	0	0	M, L	-	-	-	-	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	4,779	55	7														
TOTAL	8,498	99	11														
SUBTOTAL SENTINEL-B	16,645	189	23		A	B	C	D	E	F	G	H	I	J	K	L	M
L EXCAVATED (TONS):	29,004	339	38		1,618	963	1,355	-	8,013	-	72,587	33,746	1,205	8,719	20,421	5,384	-
					1.21%	0.72%	1.01%	0.00%	6.00%	0.00%	54.34%	25.26%	0.90%	6.53%		4.03%	0.00%

	A - Butterfield Pit A	B - Waste Pile B	C - West Road C	D - Butterfield Crusher D	E - Sentinel Pit E	F - Crushed Pile F	G - Sentinel/ Butterfield to Plant G	H - White Ridge to Plant H	I - Plant Feed I	J - White Knob Pit J	K - On-Road Trucks K	L - Crusher to White Ridge L	M - White Ridge Pit M
Ore to Primary Crushe	3,360	775	1,015	-	3,000	-	38,000	24,260	365	3,725	6,186	2300	1300
USDT													
Sentinel	-	-	-	-	66	-	-	-	-	-	-	-	-
Butterfield 3	11	-	3	-	-	-	-	-	-	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-	75	-	-	-
Annex	-	-	-	-	-	-	-	-	-	-	-	-	-
White Ridge	-	-	-	-	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield													
TOTAL													
Ore Hauled to Plant													
USDT													
Sentinel	-	-	-	-	-	-	711	-	7	-	-	-	-
Butterfield 3	-	-	-	-	-	-	104	-	1	-	-	-	-
White Knob	-	-	-	-	-	-	-	417	6	-	-	39	-
Annex	-	-	-	-	-	-	-	-	-	-	-	-	-
White Ridge	-	-	-	-	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield													
TOTAL											239		
Waste Total													
USDT													
Sentinel													
Butterfield 3													
White Knob													
Annex													
White Ridge													
Sentinel - Butterfield													
TOTAL													
Waste Crusher Fines													
USDT													
Sentinel	-	3	3	-	-	-	-	-	-	-	-	-	-
Butterfield 3	-	0	0	-	-	-	-	-	-	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-	-	-	7	-
Annex	-	-	-	-	-	-	-	-	-	-	-	-	-
White Ridge	-	-	-	-	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield													
TOTAL													
Waste Rock Not Proce													
USDT													
Sentinel	-	7	9	-	27	-	-	-	-	-	-	-	-
Butterfield 3	4	1	-	-	-	-	-	-	-	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-	31	-	19	-
Annex	-	-	-	-	-	-	-	-	-	-	-	-	-
White Ridge	-	-	-	-	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield													
TOTAL													
SUBTOTAL SENTINEL-B	A	B	C	D	E	F	G	H	I	J	K	L	M
L EXCAVATED (TONS):	15	11	16	-	93	-	816	417	14	106	239	66	-
	0.99%	0.71%	1.05%	0.00%	6.01%	0.00%	52.46%	26.79%	0.91%	6.85%		4.23%	0.00%

	A - Butterfield Pit A	B - Waste Pile B	C - West Road C	D - Butterfield Crusher D	E - Sentinel Pit E	F - Crushed Pile F	G - Sentinel/ Butterfield to Plant G	H - White Ridge to Plant H	I - Plant Feed I	J - White Knob Pit J	K - On-Road Trucks K	L - Crusher to White Ridge L	M - White Ridge Pit M	Offsite per Year	per Day	per Hour
Ore to Primary Crushe	3,360	775	1,015	-	3,000	-	38,000	24,260	365	3,725	6,186	2300	1300			
USDT																
Sentinel	-	-	-	-	8	-	-	-	-	-	-	-	-			
Butterfield 3	1	-	0	-	-	-	-	-	-	-	-	-	-			
White Knob	-	-	-	-	-	-	-	-	-	8	-	-	-			
Annex	-	-	-	-	-	-	-	-	-	-	-	-	-			
White Ridge	-	-	-	-	-	-	-	-	-	-	-	-	-			
Sentinel - Butterfield																
TOTAL																
Ore Hauled to Plant																
USDT																
Sentinel	-	-	-	-	-	-	85	-	1	-	-	-	-			
Butterfield 3	-	-	-	-	-	-	13	-	0	-	-	-	-			
White Knob	-	-	-	-	-	-	-	42	1	-	-	4	-			
Annex	-	-	-	-	-	-	-	-	-	-	-	-	-			
White Ridge	-	-	-	-	-	-	-	-	-	-	-	-	-			
Sentinel - Butterfield																
TOTAL											27			5,751,988	67,320	7,480
Waste Total																
USDT																
Sentinel																
Butterfield 3																
White Knob																
Annex																
White Ridge																
Sentinel - Butterfield																
TOTAL																
Waste Crusher Fines																
USDT																
Sentinel	-	0	0	-	-	-	-	-	-	-	-	-	-			
Butterfield 3	-	0	0	-	-	-	-	-	-	-	-	-	-			
White Knob	-	-	-	-	-	-	-	-	-	-	-	1	-			
Annex	-	-	-	-	-	-	-	-	-	-	-	-	-			
White Ridge	-	-	-	-	-	-	-	-	-	-	-	-	-			
Sentinel - Butterfield																
TOTAL																
Waste Rock Not Proce																
USDT																
Sentinel	-	1	1	-	3	-	-	-	-	-	-	-	-			
Butterfield 3	1	0	-	-	-	-	-	-	-	-	-	-	-			
White Knob	-	-	-	-	-	-	-	-	-	3	-	2	-			
Annex	-	-	-	-	-	-	-	-	-	-	-	-	-			
White Ridge	-	-	-	-	-	-	-	-	-	-	-	-	-			
Sentinel - Butterfield																
TOTAL																
SUBTOTAL SENTINEL-B	A	B	C	D	E	F	G	H	I	J	K	L	M			
L EXCAVATED (TONS):	2	1	2	-	11	-	98	42	2	11	27	7	-			
	1.05%	0.76%	1.13%	0.00%	6.42%	0.00%	56.04%	23.85%	0.90%	6.09%		3.76%	0.00%			

Omya California Inc.

PLANT KWH / TON BY MONTH

MONTH	PRODUCTION (TONS)	ELECTRICITY (KWH)
Jan-04	37,319	1,753,718
Feb-04	50,419	1,754,299
Mar-04	52,769	2,071,915
Apr-04	52,625	1,894,301
May-04	52,963	1,733,040
Jun-04	55,561	2,093,314
Jul-04	62,061	2,173,502
Aug-04	59,948	2,068,469
Sep-04	54,791	2,064,754
Oct-04	60,672	2,238,763
Nov-04	51,939	2,002,699
Dec-04	51,321	2,236,882
Jan-05	49,451	1,894,003
Feb-05	49,757	1,987,080
Mar-05	59,403	2,303,741
Apr-05	56,580	2,274,389
May-05	56,110	2,127,898
Jun-05	56,336	2,439,331
Jul-05	56,846	2,422,262
Aug-05	53,252	2,134,517
Sep-05	56,586	2,543,467
Oct-05	59,461	2,558,554
Nov-05	56,101	2,448,648
Dec-05	48,944	2,242,656
Jan-06	51,085	2,143,747
Feb-06	51,076	2,540,530
Mar-06	55,005	2,125,277
Apr-06	49,929	2,012,434
May-06	54,513	2,013,370
Jun-06	57,555	2,303,333
Jul-06	54,645	2,116,066
Aug-06	58,365	2,109,240
Sep-06	54,378	2,312,909
Oct-06	48,976	2,027,626
Nov-06	43,654	1,817,438
Dec-06	33,216	1,766,510
TOTAL	1,913,612	76,750,682

PLANT USES: 40.11 KWH/TON

Omya California Inc.

Sentinel KWH / TON BY MONTH

MONTH	PRODUCTION	KWH
Jan-05	8,580	10,579
Feb-05	1,560	10,872
Mar-05	20,280	3,304
Apr-05	22,464	9,074
May-05	60,792	12,807
Jun-05	78,780	15,263
Jul-05	58,968	18,469
Aug-05	70,902	13,483
Sep-05	54,756	16,070
Oct-05	45,942	16,208
Nov-05	53,076	14,888
Dec-05	57,786	18,340
Jan-06	24,726	12,208
Feb-06	30,852	12,636
Mar-06	14,544	9,508
Apr-06	17,394	6,405
May-06	25,818	9,732
Jun-06	55,302	14,885
Jul-06	29,874	12,212
Aug-06	73,710	18,173
Sep-06	66,846	18,247
Oct-06	59,982	17,515
Nov-06	42,744	17,736
Dec-06	16,980	18,173
TOTAL	992,658	326,787

SENTINEL: 0.33 KWH/TON

Unpaved Road Emissions Factors

EF= k * (S/12)^a * (W/3)^b * [(N-P)/N]

	TSP	PM10	PM2.5	
k=	4.9	1.5	0.15	
a=	0.7	0.9	0.9	
b=	0.45	0.45	0.45	
N=	365	365	365	(days/yr)
P (Los Angeles-MDAB)=	33	33	33	(rain days/yr)

Sources: AP-42, Section 13.2.2 (Nov. 2006), CalEEMod User Manual Appendix D
CalEEMod User Manual, Appendix D

UNCONTROLLED FACTOR

S= 8.3 %

Control Factor = 0%

Parameter	Weight (tons)	TSP (lb/VMT)	PM10 E.F. (lb/VMT)	PM2.5 E.F. (lb/VMT)
Full =	120	19.91	5.66	0.57
Empty =	45	12.80	3.64	0.36
Average =	82.5	16.36	4.65	0.47
Annual Average[1] =	---	14.88	4.23	0.42

UNMITIGATED FACTOR

S= 8.3 %

Control Factor[2] = 84%

Parameter	Weight (tons)	TSP (lb/VMT)	PM10 E.F. (lb/VMT)	PM2.5 E.F. (lb/VMT)
Full =	120	3.19	0.91	0.09
Empty =	45	2.05	0.58	0.06
Average =	82.5	2.62	0.74	0.07
Annual Avg.[1] =	---	2.38	0.68	0.07

[1] Annual average emissions factors take into account the rainfall adjustment factor [(N-P)/N].
This adjustment factor is not included in the daily emissions estimate.

[2] The control factor for the unmitigated emissions is chemical dust suppressants.

Paved Road Emissions Factors

EF= k * (sL)^a * (W)^b * (1-P/4N)

	TSP	PM10	PM2.5
k=	0.011	0.0022	0.00054
a=	0.91	0.91	0.91
b=	1.02	1.02	1.02
P=	33	33	33
N=	365	365	365

Source: AP-42, Section 13.2.1 (Jan. 2011)

OFFSITE

sL= 0.1 g/m^2

Parameter	Weight (tons)	TSP (lb/VMT)	PM10 E.F. (lb/VMT)	PM2.5 E.F. (lb/VMT)
Full =	40	0.0583	0.0117	0.0029
Empty =	12	0.0171	0.0034	0.0008
Average =	26	0.0377	0.0075	0.0018
Annual Avg.[1] =	---	0.0368	0.0074	0.0018

[1] Annual average emissions factors take into account the rainfall adjustment factor [(N-P)/N].
This adjustment factor is not included in the hourly and daily emissions estimates.

Default silt loading in CalEEMod is 0.1 g/m2 and is used to model offsite road emissions.

SESPE CONSULTING, INC.
5920 Friars Road, Suite 103 • San Diego, California 92108

MEMORANDUM

Date: August 28, 2012

To: File

From: Scott Cohen

Re: Using OFFROAD2011 to Obtain Emissions Factors

The OFFROAD2011 model contains table data that is used to calculate emissions from offroad vehicles that are subject to the In Use Offroad Air Toxic Control Measure (ATCM). A table summarizing the results of the offroad model is also included. Information in the model can be used in various ways to estimate emissions and emissions factors. This memo summarized the ways in which SESPE may use the OFFROAD2011 model in preparing emissions calculations.

1. Emissions Factors for a Specific Offroad Vehicle

The following example is for a 2002 model year, 250 hp to 500 hp engine (i.e. 500 hp bin) that is powers a loader during calendar year 2011. Such a loader engine would have the following attributes in the OFFROAD2011 model:

- NOx emissions factors (EF_0 = 4.51 g/hp-hr and EF_{det} = 6.32E-05 g/hp-hr^2) from the table named EMFACUpdate;
- Load factor for a loader (LF = 0.3618) from the table named LoadFactor;
- Cumulative hours for a nine year old loader (12,000 hours) from the table named ActivityCMHrs; and
- NOx Fuel correction factor (FCF = 0.948) from table named FuelCorrectionFactorUpdate.

Emissions would be calculated by the following equation

$$NOx\ Emissions\ (grams) = HP \times LF \times\ (EF_0 \times hours + EF_{det} \times cumulative\ hours) \times FCF$$

Emissions in OFFROAD2011 are in units of tons (per day). Thus, the results of the above equation would be converted to tons by dividing by 453.59 g/lb and 2000 lb/ton.

In order to check the above calculation method, emissions reported in table osmEmissionsForAirBasin for all 2002 model year engines in loaders are examined. First, the average horsepower of all such loaders is calculated by multiplying the total pounds of fuel burned by the brake specific fuel consumption (0.367) and then dividing by the applicable load factor (0.3618). The average horsepower of the 2002 engines in loaders between 250 hp and 500 hp is calculated to be 319.6 hp. Next, the emissions are calculated using the average horsepower and compared to the total emissions in osmEmissionsForAirBasin. As shown in Attachment 1, the percent difference between the calculated value and the osmEmissionsForAirBasin total is less than one percent (1%). Therefore, then calculation method including units of measure and other assumptions is confirmed to be correct.

2. Emissions Factors for the Average Vehicle of a Particular Type and Size by Calendar Year

Average emissions factors for a vehicle of a particular size, type during each calendar year can be estimated using data in the table named osmEmissionsForAirBasin. Attachment 2 contains loader NOx emissions factors that are calculated for each calendar year for the 500 hp bin. The average horsepower for each year is calculated as discussed above. Then the total NOx emissions are used to back-calculated the NOx emissions factor. By back-calculating the emissions factor from the total, the deterioration factor and fuel correction factor are incorporated into the result which reflects the average NOx emissions factor for a unit in the 500 hp bin during each calendar year.

Two queries were developed in order to automate the process of calculating emissions factors for the average unit by calendar year. First, a query named EmissionsTotal sums the fuel use, hours of operation, and emissions of NOx, PM, and HC:

```
SELECT osmEmissionsForAirBasin.CalendarYear,
       Sum(osmEmissionsForAirBasin.ScenBSFC) AS SumOfScenBSFC,
       Sum(osmEmissionsForAirBasin.ScenNOx) AS SumOfScenNOx,
       Sum(osmEmissionsForAirBasin.ScenPM) AS SumOfScenPM,
       Sum(osmEmissionsForAirBasin.ScenHC) AS SumOfScenHC,
       Sum(osmEmissionsForAirBasin.ScenActivity) AS SumOfScenActivity,
       osmEmissionsForAirBasin.HorsepowerBin,
       osmEmissionsForAirBasin.EquipmentTypeID
FROM osmEmissionsForAirBasin
INNER JOIN LookupEquipmentType
ON osmEmissionsForAirBasin.EquipmentTypeID = LookupEquipmentType.EquipmentTypeID
GROUP BY osmEmissionsForAirBasin.CalendarYear,
       osmEmissionsForAirBasin.HorsepowerBin,
       osmEmissionsForAirBasin.EquipmentTypeID
HAVING (((osmEmissionsForAirBasin.EquipmentTypeID)=[EquipTypeIdentification]));
```

Next, a query named EmissionsFactors performs the necessary back-calculations to determine the average emissions factors by calendar year:

```
SELECT EmissionsTotals.CalendarYear,
       EmissionsTotals.SumOfScenBSFC,
       EmissionsTotals.SumOfScenNOx,
       EmissionsTotals.SumOfScenPM,
       EmissionsTotals.SumOfScenHC,
       EmissionsTotals.SumOfScenActivity,
       EmissionsTotals.HorsepowerBin,
       [EmissionsTotals]![SumOfScenBSFC]/0.367/[EmissionsTotals]![SumOfScenActivity]/[L
       oadFactor] AS AvgHP,
       [SumOfScenNOx]*2000*453.59237/[AvgHP]/[SumOfScenActivity]/[LoadFactor] AS NOxEF,
       [SumOfScenPM]*2000*453.59237/[AvgHP]/[SumOfScenActivity]/[LoadFactor] AS PMEF,
       [SumOfScenHC]*2000*453.59237/[AvgHP]/[SumOfScenActivity]/[LoadFactor] AS HCEF
FROM EmissionsTotals;
```

Before running the above queries, the user must know the EquipmentTypeID and the load factor. OFFROAD2011 stores the numerical EquipmentTypeID and the load factor in the LoadFactor table and the name associated with each EquipmentTypeID is located in the LookupEquipmentType table. Attachment 2 contains the results of a query which combines these two OFFROAD2011 tables into one table that can be referenced. Attachment 3 contains output from the EmissionsFactors query for loaders in the 500 hp bin.

CalendarYear	FleetSize	AirBasin	ModelYear	EquipmentType	HorsepowerBin	BaseBSFC lb fuel	BaseNOx tpd	BaseActivity hours	ScenBSFC lb fuel	ScenNOx tpd	ScenActivity hours
2011	L	NCC	2002	24	500	40968	0.609564189	932.2506108	40968.44013	0.60956419	932.2506108
2011	L	SV	2002	24	500	198752	2.957209393	4522.674252	198752.2531	2.95720939	4522.674252
2011	L	LC	2002	24	500	2787	0.041465898	63.41679777	2786.897914	0.0414659	63.41679777
2011	L	MC	2002	24	500	15028	0.2235959	341.9613855	15027.7451	0.2235959	341.9613855
2011	L	NC	2002	24	500	10366	0.154235226	235.8830888	10366.05617	0.15423523	235.8830888
2011	L	NEP	2002	24	500	1567	0.023308623	35.64756369	1566.558457	0.02330862	35.64756369
2011	L	SC	2002	24	500	882289	13.12745811	20076.77134	882288.5125	13.1274581	20076.77134
2011	L	SCC	2002	24	500	73602	1.095111184	1674.832755	73601.75969	1.09511118	1674.832755
2011	L	SD	2002	24	500	236408	3.517484385	5379.543328	236407.9961	3.51748439	5379.543328
2011	L	SF	2002	24	500	466116	6.935282585	10606.62936	466116.144	6.93528259	10606.62936
2011	L	SJV	2002	24	500	373931	5.563670273	8508.923429	373930.9108	5.56367027	8508.923429
2011	L	SS	2002	24	500	79345	1.180560925	1805.517226	79344.78508	1.18056093	1805.517226
2011	L	MD	2002	24	500	65057	0.967971201	1480.388381	65056.75839	0.9679712	1480.388381
2011	L	LT	2002	24	500	4617	0.068696677	105.0627975	4617.062065	0.06869668	105.0627975
2011	L	GBV	2002	24	500	726	0.010796839	16.51238755	725.6490397	0.01079684	16.51238755
2011	M	NCC	2002	24	500	6195	0.092179876	147.8877417	6195.35364	0.09217988	147.8877417
2011	M	SV	2002	24	500	30056	0.447196865	717.4552358	30055.83056	0.44719686	717.4552358
2011	M	LC	2002	24	500	421	0.006270581	10.06013501	421.4419217	0.00627058	10.06013501
2011	M	MC	2002	24	500	2273	0.033812751	54.24710531	2272.534542	0.03381275	54.24710531
2011	M	NC	2002	24	500	1568	0.02332385	37.41935581	1567.581867	0.02332385	37.41935581
2011	M	NEP	2002	24	500	237	0.00352479	5.654957617	236.8990279	0.00352479	5.654957617
2011	M	SC	2002	24	500	133422	1.985168221	3184.882199	133421.9543	1.98516822	3184.882199
2011	M	SCC	2002	24	500	11130	0.16560555	265.6873924	11130.24876	0.16560555	265.6873924
2011	M	SD	2002	24	500	35750	0.5319231	853.3848142	35750.22956	0.5319231	853.3848142
2011	M	SF	2002	24	500	70487	1.048771398	1682.584538	70487.29072	1.0487714	1682.584538
2011	M	SJV	2002	24	500	56547	0.841352631	1349.814584	56546.80097	0.84135263	1349.814584
2011	M	SS	2002	24	500	11999	0.178527481	286.4185467	11998.72393	0.17852748	286.4185467
2011	M	MD	2002	24	500	9838	0.146379112	234.8416745	9838.051527	0.14637911	234.8416745
2011	M	LT	2002	24	500	698	0.010388489	16.6666556	698.2040854	0.01038849	16.6666556
2011	M	GBV	2002	24	500	110	0.001632726	2.61944554	109.7345275	0.00163273	2.61944554
2011	S	NCC	2002	24	500	7620	0.113370145	210.7865502	7619.538826	0.11337015	210.7865502
2011	S	SV	2002	24	500	36965	0.549998285	1022.599387	36965.05174	0.54999828	1022.599387

CalendarYear	FleetSize	AirBasin	ModelYear	EquipmentType	HorsepowerBin	BaseBSFC lb fuel	BaseNOx tpd	BaseActivity hours	ScenBSFC lb fuel	ScenNOx tpd	ScenActivity hours
2011	S	LC	2002	24	500	518	0.007712059	14.33885682	518.3228064	0.00771206	14.33885682
2011	S	MC	2002	24	500	2795	0.041585612	77.31918856	2794.943788	0.04158561	77.31918856
2011	S	NC	2002	24	500	1928	0.028685527	53.33435233	1927.936901	0.02868553	53.33435233
2011	S	NEP	2002	24	500	291	0.004335068	8.060093377	291.3572729	0.00433507	8.060093377
2011	S	SC	2002	24	500	164093	2.441517824	4539.458941	164092.9349	2.44151782	4539.458941
2011	S	SCC	2002	24	500	13689	0.203674881	378.6881064	13688.86548	0.20367488	378.6881064
2011	S	SD	2002	24	500	43968	0.65420135	1216.341793	43968.47669	0.65420135	1216.341793
2011	S	SF	2002	24	500	86691	1.289862508	2398.212226	86690.87829	1.28986251	2398.212226
2011	S	SJV	2002	24	500	69546	1.034762406	1923.910368	69545.75485	1.03476241	1923.910368
2011	S	SS	2002	24	500	14757	0.219567301	408.2365224	14756.98535	0.2195673	408.2365224
2011	S	MD	2002	24	500	12100	0.180028679	334.7232559	12099.61851	0.18002868	334.7232559
2011	S	LT	2002	24	500	859	0.012776591	23.75522675	858.7069353	0.01277659	23.75522675
2011	S	GBV	2002	24	500	135	0.002008056	3.733533844	134.9602527	0.00200806	3.733533844
					TOTALS:	3278242.7	48.77655512	77249.13749	3278242.741	**48.7765551**	77249.13749
									BACK-CALCULATED NOx:	**49.1774931**	
									PERCENT DIFFERENCE:	**0.82%**	

0.367	lb/hp-hr	brake specific fuel consumption (BSFC) applies to units greater than 50 hp.
8932542	hp-hr	ScenBSFC Column divided by BFSC = ScenHP-HR
115.6329	hp	ScenHP-HR divided by ScenActivity Column
0.3618	l.f.	LoadFactor table in OFFROAD2011
319.6	hp	Average horsepower of units 250 to 500 hp
4.51	NOx EF	EMFACUpdate table in OFFROAD2011 for 2002 MY engine 250 - 500 hp.
6.32E-05	NOx DF	EMFACUpdate table in OFFROAD2011 for 2002 MY engine 250 - 500 hp.
12000	cumulative hours	ActivityCMHrs table in OFFROAD2011 for nine year old loader.
0.948	NOx FCF	FuelCorrectionFactorUpdate table in OFFROAD2011.

Conversions:

2000	lb/ton
453.59237	g/lb

EquipmentTypeID	EquipmentType	Adj ARB LF
1	A/C Tug Narrow Body	0.536
2	A/C Tug Wide Body	0.536
3	Baggage Tug	0.3685
4	Belt Loader	0.335
5	Bobtail	0.3685
6	Cargo Loader	0.335
7	Cargo Tractor	0.3618
8	Forklift (GSE)	0.201
9	Lift (GSE)	0.335
10	Other GSE	0.335
11	Bore/Drill Rigs	0.5025
12	Cranes	0.2881
13	Crawler Tractors	0.4288
14	Excavators	0.3819
15	Graders	0.4087
16	Off-Highway Tractors	0.4355
17	Off-Highway Trucks	0.3819
18	Other Construction Equipment	0.4154
19	Pavers	0.4154
20	Paving Equipment	0.3551
21	Rollers	0.3752
22	Rough Terrain Forklifts	0.402
23	Rubber Tired Dozers	0.3953
24	Rubber Tired Loaders	0.3618
25	Scrapers	0.4824
26	Skid Steer Loaders	0.3685
27	Surfacing Equipment	0.3015
28	Tractors/Loaders/Backhoes	0.3685
29	Trenchers	0.5025
30	Aerial Lifts	0.3082
31	Forklifts	0.201
32	Other General Industrial Equipment	0.3417
33	Other Material Handling Equipment	0.3953
34	Drill Rig (Mobile)	0.5025
35	Workover Rig (Mobile)	0.5025
36	Sweepers/Scrubbers	0.4556
37	Passenger Stand	0.3953

CalendarYear	SumOfScenBSFC	SumOfScenNOx	SumOfScenPM	SumOfScenHC	SumOfScenActivity	HorsepowerBin	AvgHP	NOxEF	PMEF	HCEF
2009	795484.3	13.52483	1.57837	4.209929	129500	50	46.2623	5.660592	0.660601	1.761996
2009	19444602	466.4952	40.11176	46.4795	1716383	120	85.31986	7.987483	0.686807	0.795837
2009	46050646	974.7037	53.19423	73.49095	2314949	175	149.8165	7.046909	0.384583	0.531325
2009	63466227	1132.198	37.45989	61.16232	2330841	250	205.0668	5.939387	0.19651	0.320851
2009	83019654	1414.619	52.11953	83.30651	1964818	500	318.2174	5.673101	0.209017	0.334087
2009	14597578	228.078	8.767741	13.71631	189237.3	750	580.951	5.201929	0.199972	0.312837
2009	4255953	84.21503	2.336657	4.017598	38393.36	1000	834.8455	6.588015	0.182793	0.314291
2009	1691900	31.16528	0.83582	1.488808	8433.303	9999	1510.923	6.13279	0.164475	0.292972
2010	715997.9	12.20853	1.422356	3.778545	116550	50	46.26631	5.676929	0.661391	1.757012
2010	17501371	416.7788	36.1039	41.73121	1544745	120	85.32585	7.92858	0.686821	0.793872
2010	41447725	873.8488	48.24921	66.81854	2083455	175	149.8242	7.019358	0.387571	0.536733
2010	57117512	1024.338	34.22026	56.91146	2097757	250	205.0593	5.970847	0.199469	0.331736
2010	74688392	1276.786	47.5056	77.52044	1768336	500	318.0927	5.691501	0.211765	0.345561
2010	13133606	206.5284	8.033338	12.87465	170313.5	750	580.7646	5.235492	0.203645	0.326372
2010	3830215	76.56765	2.157638	3.722718	34554.02	1000	834.8143	6.65555	0.18755	0.323593
2010	1522710	28.34703	0.774174	1.393886	7589.973	9999	1510.923	6.198009	0.169271	0.30477
2011	754771	12.74524	1.449747	3.796269	122674.6	50	46.33678	5.62205	0.639497	1.674571
2011	18411501	429.5517	37.50495	43.17995	1625920	120	85.2816	7.767622	0.678205	0.780827
2011	43620817	893.8571	49.6047	68.97781	2192938	175	149.8072	6.822383	0.378609	0.526475
2011	60110794	1065.587	35.74835	60.60215	2207992	250	205.0313	5.901987	0.198	0.335658
2011	78548830	1325.78	49.58221	82.58638	1861261	500	317.8322	5.619447	0.210159	0.35005
2011	13820018	218.6842	8.601628	14.09272	179263.4	750	580.6072	5.268301	0.207221	0.339506
2011	4031325	81.25036	2.318445	4.016673	36369.81	1000	834.7803	6.710258	0.191474	0.331727
2011	1602727	30.13776	0.837035	1.521804	7988.82	9999	1510.923	6.260559	0.173879	0.316126
2012	792466.4	13.50252	1.549871	4.061612	128799.2	50	46.33754	5.672778	0.651143	1.706394
2012	19330172	449.0382	39.34213	45.36549	1707095	120	85.27924	7.734092	0.677616	0.781361
2012	45787866	935.9932	52.28397	73.21025	2302422	175	149.7721	6.805877	0.380172	0.532333
2012	63109253	1115.192	37.69609	65.07559	2318228	250	205.0229	5.883265	0.198868	0.34331
2012	82450291	1392.057	52.55014	89.16521	1954185	500	317.7546	5.621168	0.212199	0.360052
2012	14511983	228.937	9.075095	15.20448	188213.2	750	580.6868	5.252317	0.208203	0.348824
2012	4232404	85.79728	2.470937	4.302467	38185.6	1000	834.7432	6.749137	0.194373	0.338448
2012	1682745	31.9293	0.900139	1.651664	8387.667	9999	1510.923	6.317323	0.178096	0.326788
2013	830079.8	13.87685	1.559876	4.060634	134923.8	50	46.33365	5.565867	0.625651	1.62868
2013	20245767	459.3817	40.17761	46.4028	1788270	120	85.26414	7.554422	0.660711	0.763083
2013	47955694	953.1783	53.17586	75.21843	2411906	175	149.7425	6.617528	0.369178	0.522211
2013	66102392	1147.257	39.13775	68.76043	2428463	250	204.9986	5.778371	0.197124	0.346324
2013	86341809	1428.669	54.20421	93.78424	2047110	500	317.6474	5.508992	0.209013	0.361635
2013	15223625	235.6801	9.375073	16.08219	197163.1	750	581.5109	5.154264	0.20503	0.351713
2013	4433445	89.00589	2.576008	4.489285	40001.38	1000	834.7024	6.684043	0.19345	0.33713
2013	1762762	33.68518	0.961119	1.780331	8786.514	9999	1510.923	6.362196	0.181529	0.336255
2014	866883.5	14.31514	1.585031	4.098854	141048.4	50	46.28687	5.497898	0.60875	1.574213
2014	21109684	457.9051	39.7522	46.06419	1869446	120	85.04216	7.221968	0.626962	0.726513
2014	50133312	946.0177	52.83873	75.43156	2521390	175	149.7448	6.282531	0.350904	0.500943
2014	69083373	1145.646	38.94473	70.05216	2538699	250	204.9405	5.521265	0.187688	0.337606
2014	90115610	1417.28	53.40894	94.95858	2140035	500	317.1353	5.236213	0.197322	0.350829
2014	15894821	237.4446	9.383052	16.56475	206112.9	750	580.7856	4.973574	0.19654	0.346969
2014	4634443	93.39919	2.721359	4.770944	41817.17	1000	834.6574	6.709766	0.195501	0.342743
2014	1842779	35.4518	1.022967	1.911448	9185.361	9999	1510.923	6.405115	0.18482	0.345343
2015	904482	14.95894	1.651025	4.263328	147173	50	46.28465	5.506336	0.607737	1.569317

CalendarYear	SumOfScenBSFC	SumOfScenNOx	SumOfScenPM	SumOfScenHC	SumOfScenActivity	HorsepowerBin	AvgHP	NOxEF	PMEF	HCEF
2015	22034643	469.8943	40.61848	47.39127	1950621	120	85.07433	7.099961	0.613733	0.716068
2015	52303589	959.6145	53.61854	77.39714	2630874	175	149.7259	6.108395	0.341307	0.492669
2015	72071297	1167.957	39.87548	72.90785	2648934	250	204.9069	5.395434	0.184207	0.336801
2015	93855486	1429.035	53.95714	97.71088	2232959	500	316.5514	5.069265	0.191404	0.346613
2015	16608073	234.6374	9.225203	16.80371	215062.8	750	581.5933	4.703702	0.184935	0.336859
2015	4835391	97.74798	2.864355	5.051515	43632.96	1000	834.6076	6.730355	0.197223	0.347818
2015	1922796	37.21438	1.084718	2.043659	9584.208	9999	1510.923	6.44376	0.187821	0.353865
2016	942211.7	15.42918	1.681585	4.329943	153297.7	50	46.28906	5.452003	0.594199	1.530014
2016	22940141	459.5581	39.44713	46.30203	2031796	120	85.0318	6.669698	0.572507	0.671995
2016	54469279	938.6039	52.34292	76.57778	2740358	175	149.6958	5.737102	0.31994	0.468072
2016	75064747	1158.972	39.52724	73.63873	2759170	250	204.891	5.140423	0.175316	0.326612
2016	97615496	1372.236	51.54389	95.85646	2325884	500	316.0793	4.680281	0.175801	0.326937
2016	17358799	223.7947	8.797873	16.53089	224012.6	750	583.5964	4.292318	0.168741	0.317058
2016	5036280	101.99	3.000598	5.320876	45448.74	1000	834.552	6.742323	0.198363	0.351751
2016	2002813	33.56578	0.929072	1.754828	9983.055	9999	1510.923	5.579793	0.154444	0.291713
2017	980588.9	15.78367	1.677705	4.286872	159422.3	50	46.32371	5.358989	0.569627	1.455511
2017	23857882	452.6809	38.44312	45.41443	2112971	120	85.03618	6.317162	0.536474	0.633759
2017	56653912	885.6915	49.34791	73.47903	2849842	175	149.7182	5.204923	0.290002	0.431813
2017	78083362	1120.36	38.16652	72.57634	2869405	250	204.9425	4.777063	0.162737	0.309456
2017	1.01E+08	1311.634	49.43327	94.11002	2418809	500	315.8379	4.305009	0.162249	0.308885
2017	18055835	225.9764	8.921091	16.92765	232962.4	750	583.7099	4.166846	0.164499	0.312134
2017	5237100	103.3687	3.025756	5.403018	47264.53	1000	834.4896	6.571433	0.192356	0.343485
2017	2084677	28.0939	0.671277	1.276847	10381.9	9999	1512.263	4.486781	0.107207	0.203921
2018	1018654	15.6343	1.585005	4.015649	165546.9	50	46.34162	5.109912	0.518043	1.312474
2018	24774755	412.3757	34.05524	40.82555	2194146	120	85.03725	5.541732	0.457653	0.548636
2018	58831743	773.2941	42.89501	65.5502	2959326	175	149.7216	4.376176	0.242749	0.370957
2018	81047125	1010.868	34.28384	67.43425	2979641	250	204.8515	4.152584	0.140836	0.277016
2018	1.05E+08	1193.235	44.6742	88.35773	2511733	500	315.8818	3.770988	0.141184	0.279237
2018	18743519	205.298	8.108368	15.83084	241912.3	750	583.5238	3.646661	0.144027	0.281199
2018	5431100	92.92509	2.524548	4.546652	49080.32	1000	833.3853	5.696485	0.15476	0.278718
2018	2162848	26.68439	0.580171	1.112553	10780.75	9999	1510.923	4.107648	0.089308	0.17126
2019	1056177	15.50668	1.477575	3.778938	171671.5	50	46.33442	4.888144	0.465774	1.191228
2019	25666341	391.3426	31.42409	38.41888	2275321	120	84.95454	5.07639	0.407625	0.498359
2019	61018193	708.4688	39.15897	61.46611	3068809	175	149.7458	3.865656	0.213665	0.335381
2019	84049882	950.1183	31.856	64.87774	3089876	250	204.862	3.763591	0.126187	0.256992
2019	1.09E+08	1091.752	40.75346	83.90813	2604658	500	316.0437	3.325472	0.124135	0.255584
2019	19530909	181.3558	7.11549	14.55843	250862.1	750	586.3444	3.091511	0.121295	0.248173
2019	5631499	92.72976	2.482896	4.540003	50896.1	1000	833.3067	5.482226	0.14679	0.268407
2019	2242696	27.74687	0.603995	1.180112	11179.6	9999	1510.809	4.119128	0.089665	0.175192
2020	1094125	15.53293	1.401832	3.61752	177796.1	50	46.34576	4.726594	0.426571	1.100794
2020	26590858	379.4237	29.71246	37.17013	2356496	120	84.98279	4.750659	0.372022	0.465397
2020	63188352	668.7519	36.80657	59.50741	3178293	175	149.7299	3.523626	0.193932	0.313542
2020	87020672	899.0397	29.84516	63.03243	3200112	250	204.7966	3.439682	0.114186	0.241159
2020	1.13E+08	1037.535	38.58073	82.15244	2697583	500	316.1196	3.050729	0.113441	0.241558
2020	20282502	172.1757	6.685806	14.23545	259812	750	587.9329	2.82626	0.109747	0.233675
2020	5830653	92.41115	2.436786	4.528366	52711.89	1000	833.0556	5.27678	0.139143	0.258575
2020	2322701	28.85636	0.629221	1.262113	11578.44	9999	1510.805	4.136281	0.090193	0.180912
2021	1131499	15.21318	1.251474	3.350286	183920.7	50	46.33284	4.476386	0.368239	0.985802
2021	27551013	353.003	26.48818	34.46344	2437671	120	85.11925	4.265821	0.320093	0.416469

CalendarYear	SumOfScenBSFC	SumOfScenNOx	SumOfScenPM	SumOfScenHC	SumOfScenActivity	HorsepowerBin	AvgHP	NOxEF	PMEF	HCEF
2021	65346561	613.4135	33.54525	56.25789	3287777	175	149.6876	3.125305	0.170911	0.286631
2021	90028168	814.8947	27.17398	59.78651	3310347	250	204.819	3.013595	0.100493	0.221099
2021	1.17E+08	928.723	34.66658	77.70099	2790507	500	316.8948	2.63339	0.098297	0.220321
2021	20974908	169.9779	6.587371	14.43531	268761.8	750	587.7571	2.698076	0.104562	0.229133
2021	6048477	90.53184	2.327053	4.424395	54527.67	1000	835.3999	4.983301	0.128092	0.24354
2021	2402705	29.96662	0.654491	1.345334	11977.29	9999	1510.801	4.152399	0.090691	0.18642
2022	1169715	15.00549	1.119768	3.078283	190045.3	50	46.35412	4.271023	0.31872	0.876174
2022	28472884	326.117	23.06515	31.47732	2518847	120	85.13244	3.813324	0.269703	0.368068
2022	67500681	511.749	27.5991	49.53335	3397261	175	149.6389	2.524124	0.136128	0.244316
2022	93093466	659.2349	22.11232	52.47907	3420583	250	204.9673	2.357669	0.079082	0.187685
2022	1.21E+08	799.6874	29.85869	71.91101	2883432	500	317.0309	2.193492	0.0819	0.197247
2022	21756150	139.4706	5.320019	12.79927	277711.6	750	590.0018	2.134335	0.081413	0.195869
2022	6271113	68.00467	1.40034	2.991675	56343.46	1000	838.2363	3.610405	0.074345	0.15883
2022	2482709	31.07632	0.67977	1.429614	12376.14	9999	1510.797	4.167404	0.091159	0.191714
2023	1206291	14.74845	0.990241	2.82886	196169.9	50	46.31107	4.07058	0.273307	0.780767
2023	29394561	313.7071	21.30253	30.41317	2600022	120	85.14426	3.553196	0.241283	0.344474
2023	69636494	460.6434	24.66173	46.67714	3506745	175	149.554	2.202368	0.117909	0.223167
2023	96077230	597.178	19.99711	50.28917	3530818	250	204.9323	2.069403	0.069296	0.174267
2023	1.25E+08	708.2173	26.34807	68.10065	2976357	500	317.2593	1.880591	0.069964	0.180834
2023	22492919	132.301	5.113731	12.84973	286661.5	750	590.9379	1.9583	0.075693	0.1902
2023	6465622	68.47599	1.378665	3.092152	58159.25	1000	837.2534	3.526061	0.070992	0.159225
2023	2562711	32.1838	0.705016	1.514787	12774.98	9999	1510.792	4.181187	0.091593	0.196795
2024	1243776	15.02851	0.962798	2.804497	202294.5	50	46.30453	4.022866	0.257724	0.750714
2024	30328532	307.5767	20.30936	30.24943	2681197	120	85.18989	3.376477	0.22295	0.332068
2024	71764308	407.4853	21.73469	43.97715	3616229	175	149.4576	1.89045	0.100834	0.204024
2024	99069158	539.9836	18.06702	48.69311	3641054	250	204.9164	1.814696	0.060717	0.163641
2024	1.29E+08	665.9032	24.70506	67.71969	3069281	500	317.2914	1.714523	0.063609	0.17436
2024	23210661	133.1878	5.105091	13.1984	295611.3	750	591.3326	1.910463	0.073228	0.18932
2024	6668080	70.92734	1.429801	3.31863	59975.03	1000	837.3281	3.541398	0.07139	0.165699
2024	2642712	33.39659	0.732805	1.6022	13173.83	9999	1510.787	4.207402	0.092321	0.20185
2025	1257637	14.80015	0.880293	2.700925	204674.7	50	46.27606	3.918075	0.233042	0.715021
2025	30691281	276.8333	16.67371	27.10479	2712744	120	85.20628	3.003068	0.180875	0.294031
2025	72624548	348.0578	18.37816	40.4613	3658778	175	149.4902	1.595621	0.084252	0.185489
2025	1E+08	436.2477	14.65447	44.34216	3683894	250	204.9529	1.448769	0.048667	0.147259
2025	1.31E+08	567.223	20.79148	63.18094	3105395	500	317.7181	1.441525	0.052839	0.160566
2025	23493193	118.4749	4.581728	12.56269	299089.5	750	591.5701	1.678983	0.064931	0.178034
2025	6748115	62.54633	1.053847	2.769147	60680.7	1000	837.524	3.085895	0.051994	0.136623
2025	2673796	33.99149	0.746976	1.657077	13328.84	9999	1510.781	4.232566	0.093012	0.206337
2026	1272784	14.22646	0.737557	2.472334	207055	50	46.29504	3.72138	0.192931	0.646717
2026	31075468	258.976	14.65046	25.57071	2744291	120	85.28112	2.774621	0.156962	0.27396
2026	73478874	306.7472	15.91916	38.39913	3701326	175	149.5101	1.389888	0.072131	0.173989
2026	1.01E+08	381.1347	12.94906	42.89021	3726735	250	204.8744	1.251669	0.042525	0.140854
2026	1.33E+08	524.4631	19.11961	61.93119	3141508	500	317.697	1.317622	0.048035	0.155591
2026	23792564	109.828	4.154625	12.20825	302567.7	750	592.2214	1.536858	0.058137	0.170834
2026	6827373	63.71525	1.077633	2.949595	61386.37	1000	837.62	3.107074	0.052551	0.143837
2026	2705145	33.85727	0.739202	1.492533	13483.84	9999	1510.923	4.166997	0.090978	0.183694
2027	1287182	14.23859	0.703119	2.420637	209435.2	50	46.28664	3.682892	0.181866	0.626111
2027	31425244	242.7363	12.54497	24.05942	2775838	120	85.26089	2.571685	0.132909	0.254899
2027	74348715	275.0632	13.97286	36.82471	3743875	175	149.5607	1.231745	0.062571	0.164903

CalendarYear	SumOfScenBSFC	SumOfScenNOx	SumOfScenPM	SumOfScenHC	SumOfScenActivity	HorsepowerBin	AvgHP	NOxEF	PMEF	HCEF
2027	1.03E+08	323.2244	11.22077	41.19653	3769576	250	204.8941	1.049323	0.036427	0.133741
2027	1.34E+08	472.7879	17.56584	60.85875	3177621	500	317.7	1.174287	0.043629	0.151158
2027	24057547	94.09608	3.466569	11.50262	306045.9	750	592.0116	1.302213	0.047974	0.159187
2027	6906731	64.85395	1.100276	3.123887	62092.04	1000	837.7259	3.126264	0.053038	0.150586
2027	2736242	34.35132	0.750215	1.511142	13638.84	9999	1510.923	4.179754	0.091284	0.183871
2028	1301697	13.99635	0.634036	2.334328	211815.4	50	46.2826	3.579865	0.162168	0.597054
2028	31797695	231.2234	10.96646	23.03595	2807385	120	85.30196	2.421017	0.114824	0.241197
2028	75196782	245.98	12.12649	35.38693	3786424	175	149.5669	1.089087	0.053691	0.156677
2028	1.04E+08	292.6777	10.24971	41.1205	3812417	250	204.9673	0.939143	0.032889	0.131947
2028	1.35E+08	449.8796	16.70758	61.24265	3213735	500	317.3387	1.10609	0.041078	0.150573
2028	24288127	88.70153	3.299128	11.41824	309524.1	750	590.9694	1.215903	0.045224	0.156519
2028	6985276	66.10231	1.128655	3.292656	62797.71	1000	837.732	3.150611	0.053795	0.156937
2028	2767339	34.85036	0.761995	1.560496	13793.85	9999	1510.923	4.192824	0.091675	0.187742
2029	1318779	13.93336	0.571985	2.239748	214195.6	50	46.36892	3.517594	0.144402	0.565443
2029	32174771	225.7992	10.18067	22.89696	2838932	120	85.35437	2.336516	0.105347	0.236932
2029	76095795	221.2058	10.82451	34.53263	3828973	175	149.6731	0.967827	0.04736	0.151088
2029	1.05E+08	273.4534	9.629486	41.49637	3855258	250	204.9765	0.867667	0.030554	0.131668
2029	1.37E+08	424.5485	15.84455	61.23872	3249848	500	316.9402	1.033509	0.038572	0.149078
2029	24537796	87.22084	3.237043	11.70892	313002.2	750	590.4097	1.183441	0.043921	0.15887
2029	7063164	65.81549	1.101656	3.36654	63503.38	1000	837.6601	3.102349	0.051929	0.158689
2029	2798437	26.56762	0.435185	1.070151	13948.85	9999	1510.923	3.160814	0.051775	0.127318

Note: Emissions factors have fuel correction factor incorporated.

SESPE CONSULTING, INC.

5920 Friars Road, Suite 103 • San Diego, California 92108

MEMORANDUM

Date: August 28, 2012

To: File

From: Scott Cohen

Re: Using EMFAC2011-HD to Obtain Emissions Factors

Figure 1 is a screenshot of a typical EMFAC2011-HD run for a CEQA project located in the Mojave Desert Air Basin portion of Kern County.

Figure 1. Typical EMFAC2011-HD Model Input

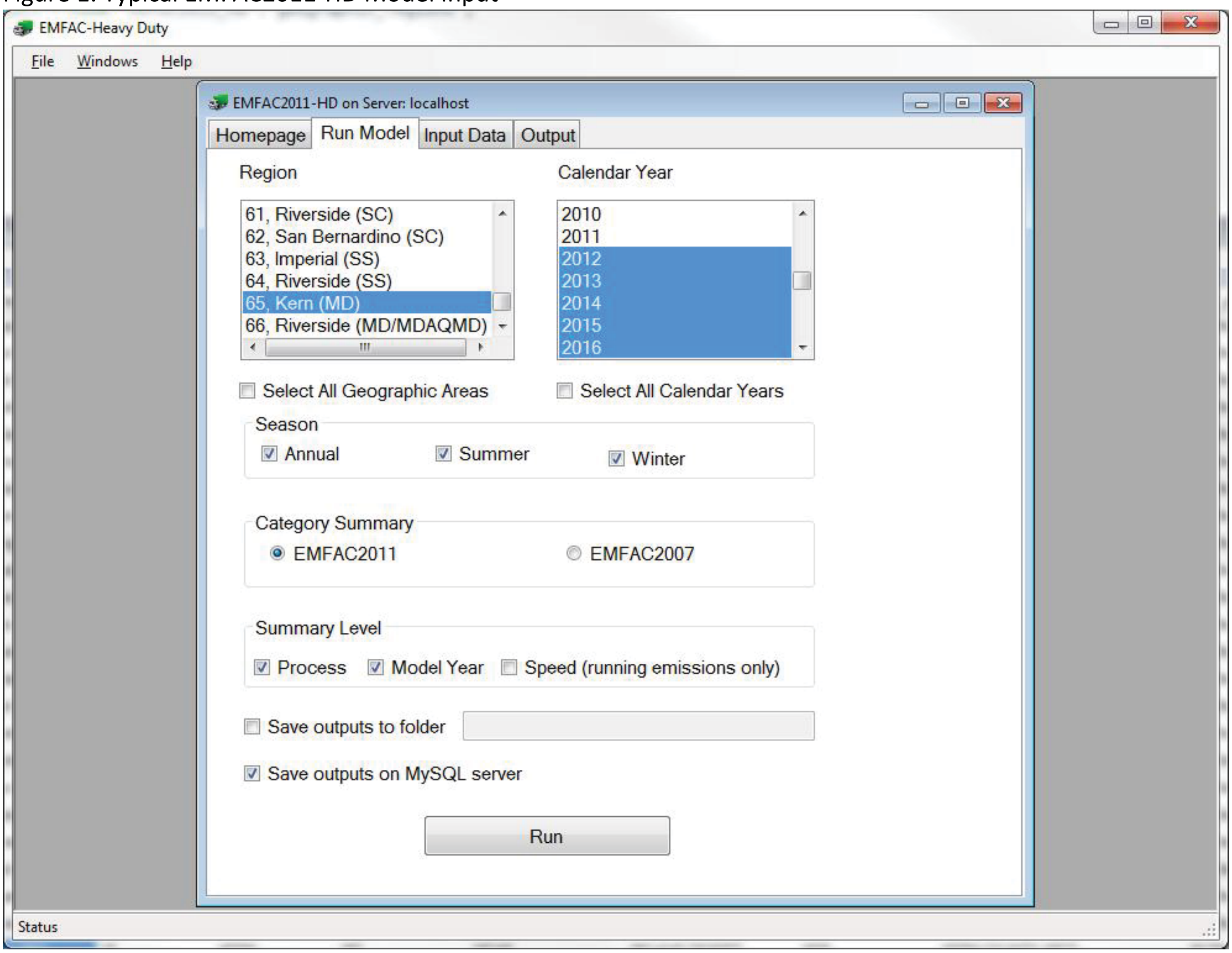
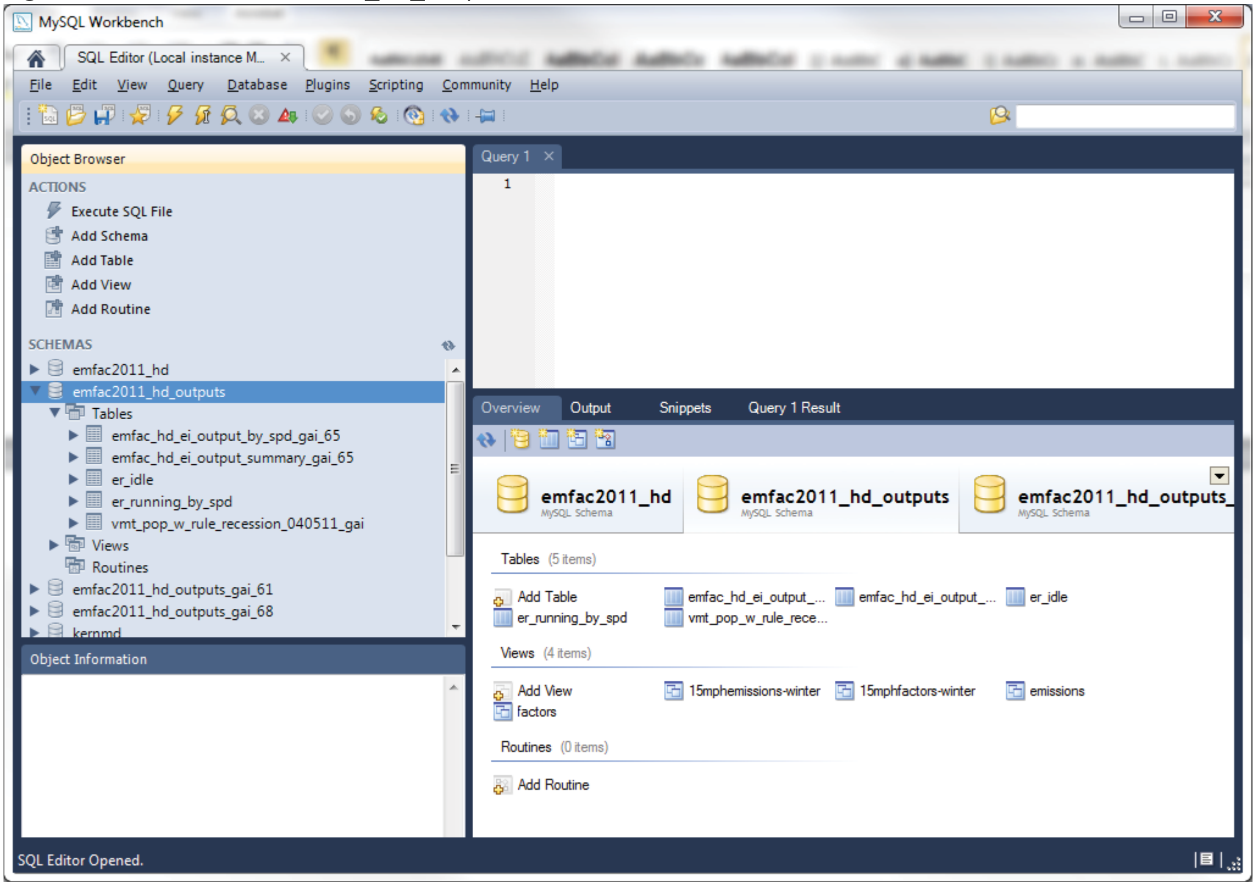


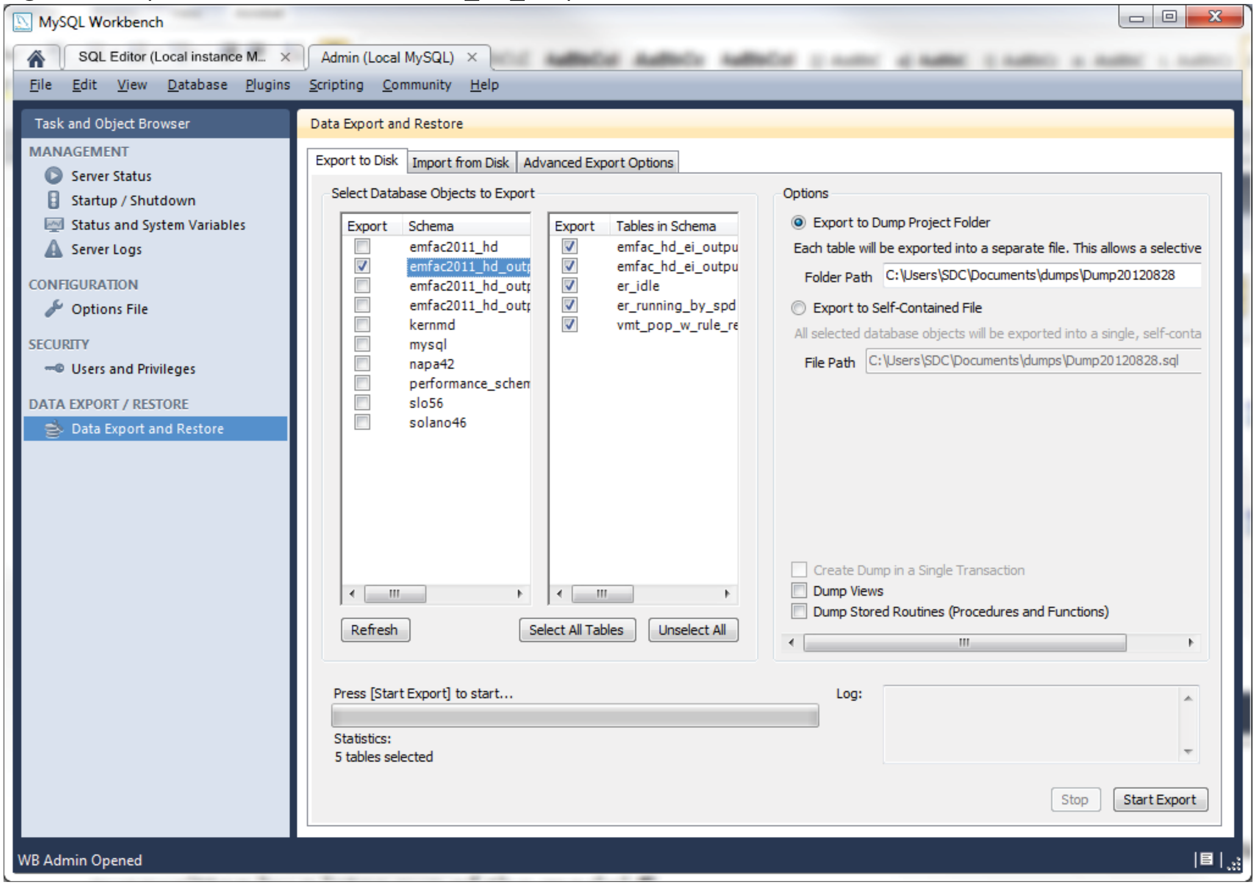
Figure 2 shows the tables that are generated by EMFFAC2011-HD in the emfac2011_hd_outputs schema. MySQL Workbench and MySQL server must be installed in order to perform the remaining tasks.

Figure 2. Tables in emfac2011_hd_outputs Schema



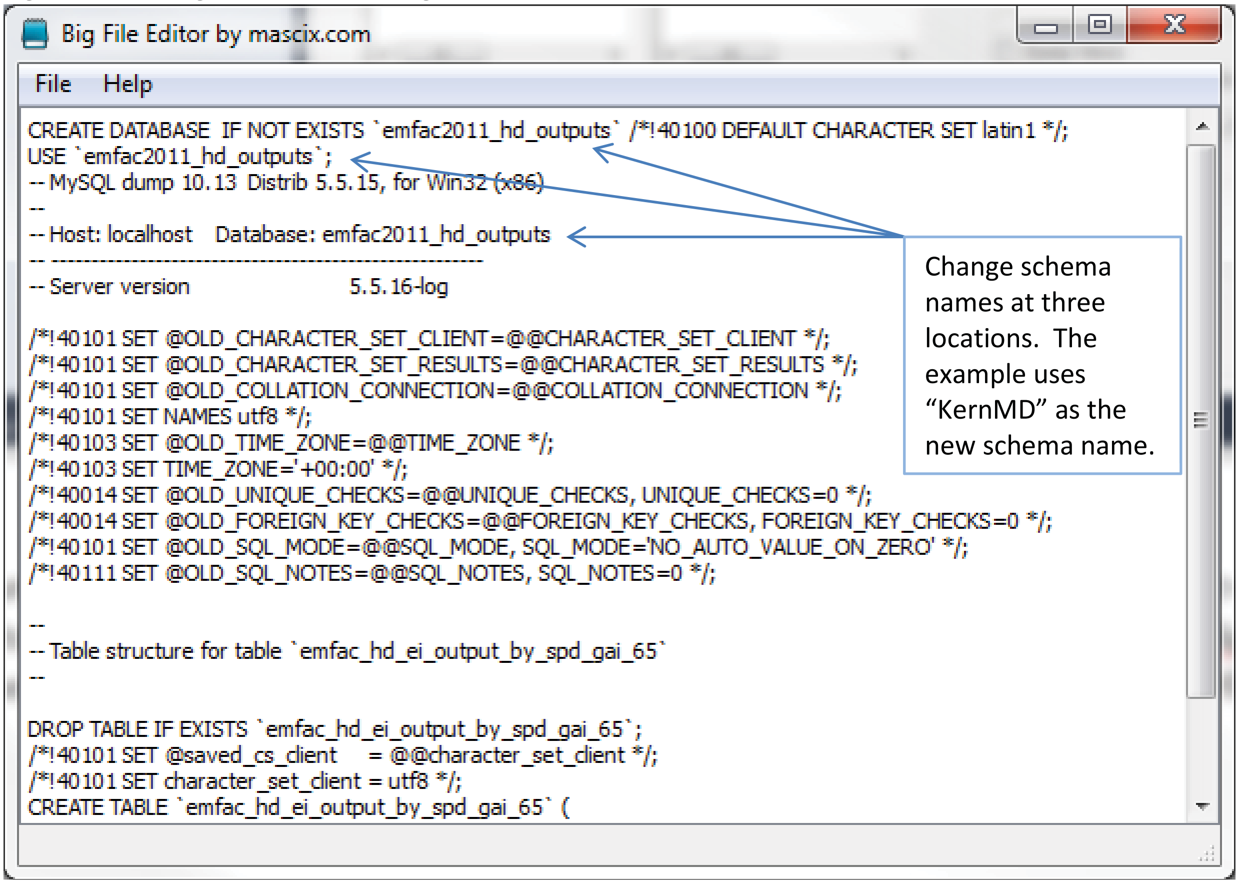
The contents of the emfac2011_hd_outputs schema must be moved in order to prevent them from being overwritten by a later run of the model. This is accomplished by exporting the data as shown in Figure 3.

Figure 3. Export Data from emfac2011_hd_output Schema



The dumped tables have references to the emfac2011_hd_outputs schema that must be manually changed in order to reload them with a different schema name. Each file is opened using BigFileEditor (http://mascix.com) and the schema name is changed manually in three places near the top of each file as shown in Figure 4.

Figure 4. Use BigFileEditor to Change Schema Name

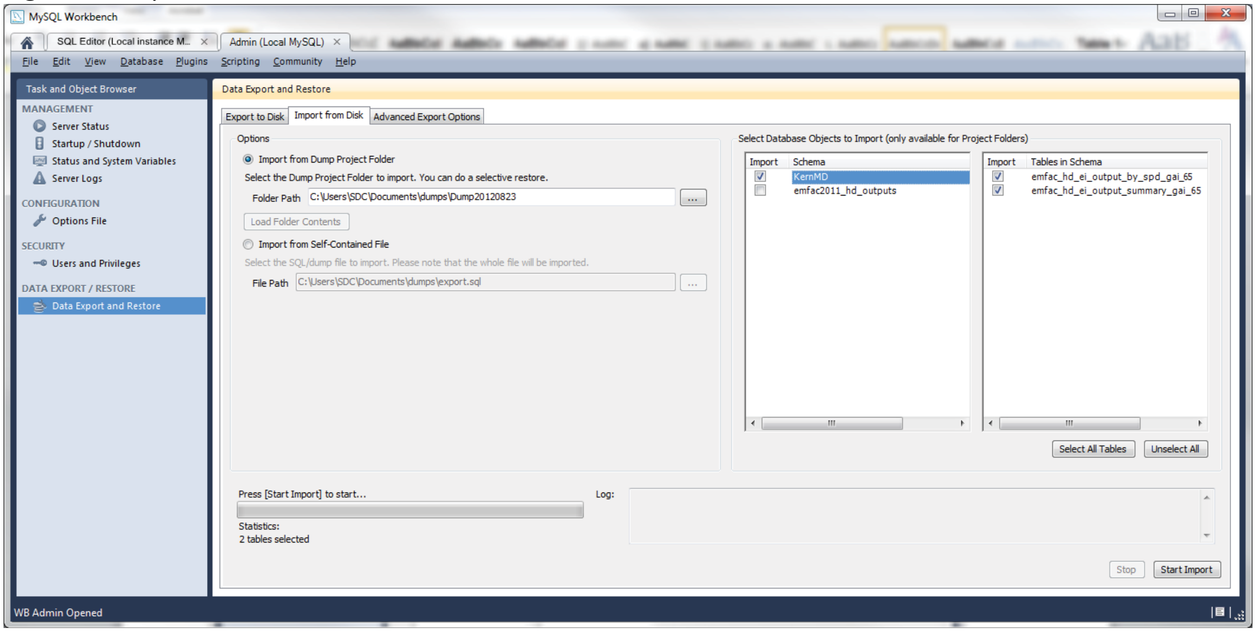


Once the files are edited to reference a new schema name, then import them using MySQL Workbench. Ensure that the file extension remains sql and has not been changed to txt by BigFileEditor when you save it. In the example case, two tables were needed to perform the calculations described later. Idling emissions factors are the same in all geographic regions and emissions estimates are discussed later in this document. Figure 5 shows the import screen.

Once the import is complete then, the tables will be available to query without having to worry about overwriting them. It may be easier to rename the tables with a more common name. For this example, the two tables are renamed as follows:

emfac_hd_ei_output_summary_gai_65 → summary
emfac_hd_ei_output_by_spd_gai_65 → byspeed

Figure 5. Import Tables into New Schema



Typically, there are a few factors that are used in evaluation of running emissions for heavy-heavy duty trucks:

- Average emissions factors that incorporate all speeds and idling for each calendar year. This type of factor would be used to estimate emissions from off-site truck travel. If daily emissions are required, then seasonal emissions may be more appropriate to use. For annual emissions, the annual emissions should be used.
- Emissions factors at a specific speed. This type of factor would be used to estimate emissions from on-site truck travel or for a road with a known speed limit. On-site travel is typically assumed to occur at a speed of 15 mph. Seasonal or annual emissions should be selected as appropriate.

1. Average Emissions Factors (all speeds)

The above emissions factors can be derived from EMFAC2011-HD by running queries on the table data. MySQL Workbench allows queries to be saved as views. The views can be used with each other. The first view created is named “emissions” and it returns results (Attachment 1) from the following query:

```
select
    `kernmd`.`summary`.`CalYr` AS `CalYr`,
    (sum(`kernmd`.`summary`.`vmt`)/3) AS `Total_VMT`,
    sum(`kernmd`.`summary`.`ROG`) AS `Total_ROG`,
    sum(`kernmd`.`summary`.`NOx`) AS `Total_NOx`,
    sum(`kernmd`.`summary`.`CO`) AS `Total_CO`,
    sum(`kernmd`.`summary`.`SOx`) AS `Total_SOx`,
    sum(`kernmd`.`summary`.`PM10`) AS `Total_PM10`,
    sum(`kernmd`.`summary`.`PM2_5`) AS `Total_PM2_5`,
    sum(`kernmd`.`summary`.`CO2`) AS `Total_CO2`,
    sum(`kernmd`.`summary`.`Fuel_DSL`) AS `Total_Fuel_DSL`
from
    `kernmd`.`summary`
where
    (`kernmd`.`summary`.`Veh` = 'T7 tractor construction')
group by `kernmd`.`summary`.`CalYr`
```

The "emissions" view calculates total emissions of each pollutant, total fuel use, and total vehicle miles traveled (VMT) for a region. VMT is divided by three (3) because the model results contain VMT in triplicate (i.e. the same VMT appears in rows for running emissions, brake wear, and tire wear). The "emissions" view example above limits the vehicle type to "T7 tractor construction" and could be modified to select a season, model year range, other vehicle types, etc. by changing the WHERE clause.

The "factors" view calculates emissions factors and miles per gallon operating on results of the "emissions" view in the following query:

```
select
    `emissions`.`CalYr` AS `CalYr`,
    ((`emissions`.`Total_ROG`*2000)/`emissions`.`Total_VMT`) AS `ROG_EF`,
    ((`emissions`.`Total_CO`*2000)/`emissions`.`Total_VMT`) AS `CO_EF`,
    ((`emissions`.`Total_NOx`*2000)/`emissions`.`Total_VMT`) AS `NOx_EF`,
    ((`emissions`.`Total_CO2`*2000)/`emissions`.`Total_VMT`) AS `CO2_EF`,
    ((`emissions`.`Total_PM10`*2000)/`emissions`.`Total_VMT`) AS `PM10_EF`,
    ((`emissions`.`Total_SOx`*2000)/`emissions`.`Total_VMT`) AS `SOx_EF`,
    ((`emissions`.`Total_VMT`/`emissions`.`Total_Fuel_DSL`)/1000) AS `MPG`
from
    `kernmd`.`emissions`
```

Total emissions of each pollutant is converted from tons to pounds and then divided by Total VMT to determine the annual average emissions factor in units of pounds per VMT for each pollutant by calendar year for "T7 tractor construction" type vehicles.

2. Emissions Factors by Speed

The following query is assigned to a view named "emissionsbyspeed-15a" and returns annual average emissions from "T7 tractor construction" type vehicles while running at 15 mph by calendar year (Attachment 3).

```
select
    `kernmd`.`byspeed`.`CalYr` AS `CalYr`,
    sum(`kernmd`.`byspeed`.`vmt`) AS `Total_VMT`,
    sum(`kernmd`.`byspeed`.`ROG`) AS `Total_ROG`,
    sum(`kernmd`.`byspeed`.`NOx`) AS `Total_NOx`,
    sum(`kernmd`.`byspeed`.`CO`) AS `Total_CO`,
    sum(`kernmd`.`byspeed`.`SOx`) AS `Total_SOx`,
    sum(`kernmd`.`byspeed`.`PM10`) AS `Total_PM10`,
    sum(`kernmd`.`byspeed`.`PM2_5`) AS `Total_PM2_5`,
    sum(`kernmd`.`byspeed`.`CO2`) AS `Total_CO2`,
    sum(`kernmd`.`byspeed`.`Fuel_DSL`) AS `Total_Fuel_DSL`
from
    `kernmd`.`byspeed`
where
    ((`kernmd`.`byspeed`.`Veh` = 'T7 tractor construction') and
(`kernmd`.`byspeed`.`Season` = 'a') and (`kernmd`.`byspeed`.`Speed_bin` = 15))
group by `kernmd`.`byspeed`.`CalYr`
```

A second view named “factorsbyspeed-15a” contains the following query which produces emissions factors in units of lb/VMT and miles per gallon (Attachment 4).

```
select
    `emissionsbyspeed-15a`.`CalYr` AS `CalYr`,
    ((`emissionsbyspeed-15a`.`Total_ROG`*2000)/`emissionsbyspeed-
15a`.`Total_VMT`) AS `ROG_EF`,
    ((`emissionsbyspeed-15a`.`Total_CO`*2000)/`emissionsbyspeed-15a`.`Total_VMT`)
AS `CO_EF`,
    ((`emissionsbyspeed-15a`.`Total_NOx`*2000)/`emissionsbyspeed-
15a`.`Total_VMT`) AS `NOx_EF`,
    ((`emissionsbyspeed-15a`.`Total_CO2`*2000)/`emissionsbyspeed-
15a`.`Total_VMT`) AS `CO2_EF`,
    ((`emissionsbyspeed-15a`.`Total_PM10`*2000)/`emissionsbyspeed-
15a`.`Total_VMT`) AS `PM10_EF`,
    ((`emissionsbyspeed-15a`.`Total_SOx`*2000)/`emissionsbyspeed-
15a`.`Total_VMT`) AS `SOx_EF`,
    ((`emissionsbyspeed-15a`.`Total_VMT`/`emissionsbyspeed-
15a`.`Total_Fuel_DSL`)/1000) AS `MPG`
from
    `kernmd`.`emissionsbyspeed-15a`
```

CalYr	Total_VMT	Total_ROG	Total_NOx	Total_CO	Total_SOx	Total_PM10	Total_PM2_5	Total_CO2	Total_Fuel_DSL
2012	9423.37093	0.008066629	0.138404642	0.03677079	0.000174925	0.006203732	0.005141723	18.33507956	1.650157161
2013	10475.84077	0.008003753	0.143422764	0.036805418	0.000194956	0.006075046	0.004960149	20.43461003	1.839114903
2014	11589.70234	0.006195982	0.147231846	0.028901341	0.000216881	0.004586902	0.003524188	22.73272979	2.045945681
2015	12766.41984	0.005681756	0.141788012	0.026353218	0.000238502	0.004010251	0.002923028	24.99897757	2.249907981
2016	14007.4274	0.00422522	0.131916566	0.020085444	0.000262448	0.00302484	0.001941948	27.50887714	2.475798942
2017	15314.18296	0.004404384	0.128956698	0.021147266	0.000286674	0.003062225	0.001897895	30.04821834	2.70433965
2018	15998.50698	0.004682058	0.120881057	0.022592429	0.000299207	0.003181871	0.001966887	31.36192954	2.822573659
2019	16697.5566	0.004888696	0.114345646	0.023695833	0.000312054	0.003302714	0.002036096	32.70843235	2.943758911
2020	17411.33182	0.005216121	0.093901691	0.0254842	0.000325417	0.003420949	0.002102023	34.10909537	3.069818584
2021	17627.24226	0.00553968	0.069014128	0.027324799	0.000329333	0.003431911	0.002099146	34.51962574	3.106766317
2022	17839.49143	0.005950424	0.053312733	0.029454545	0.000333354	0.003430608	0.002085206	34.94108389	3.14469755
2023	18048.07933	0.005701599	0.047464196	0.028365944	0.000336715	0.00343484	0.002076577	35.29334805	3.176401324
2024	18253.00596	0.005775508	0.048272443	0.028727547	0.000340471	0.003482696	0.002108302	35.68703866	3.211833479
2025	18454.27132	0.005852855	0.049057263	0.029107189	0.000344195	0.003529405	0.002139191	36.07735709	3.246962138
2026	18651.87542	0.005923469	0.049711846	0.029456374	0.000347869	0.003571825	0.002166356	36.46243188	3.281618869
2027	18845.81824	0.005981157	0.050185593	0.029745962	0.00035148	0.003608307	0.002188276	36.84097064	3.315687358
2028	19036.0998	0.006028733	0.050560292	0.029987077	0.000355011	0.00364103	0.002206958	37.21104014	3.348993613
2029	19222.72009	0.006076414	0.050957488	0.030229708	0.000358485	0.003673006	0.002225172	37.57519933	3.38176794
2030	19405.67911	0.006129296	0.051407917	0.030496523	0.000361901	0.003706191	0.002244719	37.93328549	3.413995694
2031	19792.94666	0.006250966	0.052432792	0.03110322	0.000369128	0.00377984	0.002289228	38.6907817	3.482170353
2032	20182.87843	0.006371999	0.053437936	0.031707122	0.000376403	0.003853461	0.00233355	39.45333838	3.550800454
2033	20575.47442	0.006491467	0.054422627	0.03230313	0.000383721	0.003926931	0.002377575	40.22031705	3.619828535
2034	20970.73462	0.00661045	0.05541877	0.032896827	0.000391084	0.004000534	0.002421561	40.992154	3.68929386
2035	21368.65904	0.006732975	0.056444688	0.033507392	0.000398501	0.004075538	0.002466675	41.76954839	3.759259355

Emissions are in units of tons per day and diesel fuel is in units of 1,000 gallons per day.

CalYr	ROG_EF	CO_EF	NOx_EF	CO2_EF	PM10_EF	SOx_EF	MPG
2012	0.001712047	0.007804169	0.029374763	3.891405676	0.001316669	3.71258E-05	5.71058997
2013	0.00152804	0.007026723	0.027381624	3.901283054	0.00115982	3.72201E-05	5.696131738
2014	0.001069222	0.004987417	0.025407356	3.922918662	0.000791548	3.74265E-05	5.664716539
2015	0.000890109	0.004128521	0.022212651	3.916364632	0.00062825	3.73639E-05	5.674196433
2016	0.000603283	0.002867828	0.018835231	3.927755804	0.000431891	3.74726E-05	5.65774028
2017	0.000575203	0.002761788	0.016841473	3.924233949	0.00039992	3.7439E-05	5.662817893
2018	0.000585312	0.002824317	0.015111542	3.920607039	0.000397771	3.74044E-05	5.668056503
2019	0.000585558	0.00283824	0.013696093	3.917750738	0.000395592	3.73772E-05	5.672188893
2020	0.000599164	0.002927312	0.010786273	3.91803404	0.000392957	3.73799E-05	5.671778754
2021	0.000628536	0.003100292	0.007830394	3.916622378	0.000389387	3.73664E-05	5.673823024
2022	0.000667107	0.003302173	0.005976934	3.917273543	0.000384608	3.73726E-05	5.672879869
2023	0.000631823	0.003143375	0.00525975	3.911036449	0.000380632	3.73131E-05	5.681926648
2024	0.000632828	0.003147706	0.00528926	3.910264286	0.000381602	3.73057E-05	5.683048664
2025	0.000634309	0.003154521	0.00531663	3.909919438	0.000382503	3.73025E-05	5.683549897
2026	0.000635161	0.003158543	0.005330493	3.9097872	0.000382999	3.73012E-05	5.683742129
2027	0.000634746	0.003156771	0.005325913	3.909723649	0.000382929	3.73006E-05	5.683834515
2028	0.0006334	0.003150548	0.005312043	3.90952354	0.00038254	3.72987E-05	5.684125443
2029	0.000632212	0.003145206	0.005301798	3.909457054	0.000382153	3.7298E-05	5.684222109
2030	0.000631701	0.003143051	0.005298234	3.90950353	0.00038197	3.72985E-05	5.684154536
2031	0.000631636	0.003142859	0.005298129	3.909552465	0.000381938	3.7299E-05	5.684083389
2032	0.000631426	0.003141982	0.005295373	3.909584901	0.000381854	3.72993E-05	5.68403623
2033	0.000630991	0.003139964	0.005290048	3.909539702	0.00038171	3.72988E-05	5.684101945
2034	0.000630445	0.003137403	0.005285344	3.909462853	0.000381535	3.72981E-05	5.684213678
2035	0.000630173	0.003136125	0.005282942	3.909421579	0.00038145	3.72977E-05	5.684273689

Emissions factors are in units of lb/VMT.

CalYr	Total_VMT	Total_ROG	Total_NOx	Total_CO	Total_SOx	Total_PM10	Total_PM2_5	Total_CO2	Total_Fuel_DSL
2012	50.2489574	0.000164982	0.001139853	0.000452039	1.44143E-06	5.32299E-05	4.89715E-05	0.151086217	0.01359776
2013	55.86112234	0.000160837	0.001186039	0.000440398	1.60378E-06	4.99655E-05	4.59683E-05	0.168103083	0.015129277
2014	61.80065109	0.000120127	0.001221099	0.000331898	1.78108E-06	3.57761E-05	3.2914E-05	0.18668651	0.016801786
2015	68.07535133	0.000106969	0.00118418	0.000285592	1.95465E-06	2.65761E-05	2.445E-05	0.204880381	0.018439234
2016	74.69287031	7.20502E-05	0.00111812	0.000180755	2.14309E-06	1.12696E-05	1.0368E-05	0.224631262	0.020216814
2017	81.66098236	7.24454E-05	0.001097568	0.00017969	2.33837E-06	9.32409E-06	8.57816E-06	0.24509998	0.022058998
2018	85.31005537	7.58146E-05	0.001034046	0.000187646	2.43798E-06	9.1875E-06	8.4525E-06	0.255541327	0.022998719
2019	89.03765081	7.79441E-05	0.000984933	0.000192538	2.54027E-06	9.05451E-06	8.33015E-06	0.266262878	0.023963659
2020	92.84376869	8.0047E-05	0.000841077	0.000195474	2.6425E-06	8.0104E-06	7.36956E-06	0.276978197	0.024928038
2021	93.99508434	8.22172E-05	0.00063633	0.000200487	2.66627E-06	7.15981E-06	6.58703E-06	0.279469351	0.025152242
2022	95.12687672	8.68622E-05	0.000474441	0.000211921	2.69139E-06	7.03975E-06	6.47657E-06	0.282102118	0.025389191
2023	96.23914585	8.13249E-05	0.000411912	0.000198577	2.71653E-06	6.95449E-06	6.39813E-06	0.28473751	0.025626376
2024	97.33189171	8.25472E-05	0.000419707	0.000201597	2.74729E-06	7.07584E-06	6.50977E-06	0.28796161	0.025916545
2025	98.40511432	8.37754E-05	0.000427094	0.000204616	2.77754E-06	7.19339E-06	6.61792E-06	0.291132728	0.026201946
2026	99.45881366	8.48433E-05	0.000433051	0.000207238	2.80726E-06	7.2924E-06	6.70901E-06	0.294247197	0.026482248
2027	100.4929897	8.565E-05	0.000437108	0.000209224	2.8364E-06	7.36511E-06	6.7759E-06	0.297301597	0.026757144
2028	101.5076426	8.62893E-05	0.000440216	0.000210807	2.86496E-06	7.42199E-06	6.82823E-06	0.300295886	0.02702663
2029	102.5027721	8.69112E-05	0.000443503	0.000212346	2.89298E-06	7.47712E-06	6.87895E-06	0.303232652	0.027290939
2030	103.4783784	8.76237E-05	0.000447313	0.000214099	2.92048E-06	7.53981E-06	6.93663E-06	0.306114541	0.027550309
2031	105.5434346	8.93468E-05	0.000456193	0.000218313	2.97875E-06	7.68875E-06	7.07365E-06	0.312222193	0.028099997
2032	107.6226974	9.10555E-05	0.000464864	0.000222493	3.03741E-06	7.83619E-06	7.20929E-06	0.318371483	0.028653433
2033	109.7161669	9.27452E-05	0.000473354	0.000226627	3.09648E-06	7.98159E-06	7.34307E-06	0.32456241	0.029210617
2034	111.8238429	9.44277E-05	0.000481968	0.000230744	3.15594E-06	8.12627E-06	7.47617E-06	0.330794987	0.029771549
2035	113.9457256	9.61696E-05	0.000490865	0.000235004	3.21581E-06	8.2762E-06	7.6141E-06	0.337070632	0.030336357

Emissions are in units of tons per day and diesel fuel is in units of 1,000 gallons per day.

CalYr	ROG_EF	CO_EF	NOx_EF	CO2_EF	PM10_EF	SOx_EF	MPG
2012	0.006566571	0.017991961	0.045368222	6.013506551	0.002118648	5.73717E-05	3.695385053
2013	0.005758445	0.015767612	0.042463853	6.018607437	0.001788918	5.74203E-05	3.692253143
2014	0.003887554	0.010740936	0.039517338	6.041570973	0.001157791	5.76394E-05	3.678219179
2015	0.003142674	0.008390479	0.034790276	6.019223607	0.000780785	5.74262E-05	3.691875177
2016	0.001929238	0.004839952	0.029939149	6.014797955	0.000301759	5.7384E-05	3.694591637
2017	0.001774298	0.004400889	0.026881077	6.002866311	0.000228361	5.72702E-05	3.701935221
2018	0.00177739	0.004399158	0.024242074	5.990884096	0.000215391	5.71558E-05	3.709339367
2019	0.001750812	0.004324865	0.022123964	5.980905284	0.000203386	5.70606E-05	3.715528196
2020	0.001724338	0.004210818	0.018118119	5.966543593	0.000172556	5.69236E-05	3.72447161
2021	0.001749394	0.004265915	0.013539635	5.946467379	0.000152344	5.67321E-05	3.737046015
2022	0.001826238	0.004455549	0.009974917	5.931070757	0.000148008	5.65852E-05	3.74674711
2023	0.001690059	0.00412674	0.008560181	5.917290877	0.000144525	5.64537E-05	3.755472341
2024	0.001696201	0.004142473	0.008624242	5.917107026	0.000145396	5.6452E-05	3.755589027
2025	0.001702663	0.004158655	0.008680314	5.917024342	0.0001462	5.64512E-05	3.755641508
2026	0.001706099	0.004167306	0.008708153	5.91696575	0.000146642	5.64506E-05	3.755678698
2027	0.001704597	0.004163956	0.008699267	5.916862414	0.00014658	5.64496E-05	3.75574429
2028	0.001700154	0.004153513	0.008673551	5.916714817	0.000146235	5.64482E-05	3.755837979
2029	0.001695783	0.004143225	0.008653483	5.916574661	0.000145891	5.64469E-05	3.75592695
2030	0.001693565	0.004138039	0.008645542	5.916492812	0.000145727	5.64461E-05	3.75597891
2031	0.00169308	0.004136929	0.008644655	5.916468312	0.000145698	5.64459E-05	3.755994464
2032	0.001692125	0.004134681	0.00863877	5.916437532	0.000145623	5.64456E-05	3.756014004
2033	0.00169064	0.004131148	0.008628696	5.916400826	0.000145495	5.64452E-05	3.756037306
2034	0.001688866	0.004126923	0.008620122	5.916358772	0.000145341	5.64448E-05	3.756064005
2035	0.001687989	0.004124839	0.008615761	5.916336574	0.000145266	5.64446E-05	3.756078097

Emissions factors are in units of lb/VMT.

Appendix I: Project Emissions

	Total Sentinel Butterfield	Total White Knob	Total Processing Plant	Total Offsite	Total Project w/o White Knob Reductions	Total Project w/ White Knob Reductions
HC	2.69	-1.54	0.01	0.11	2.82	1.27
NOx	48.1	-26.4	0.10	2.07	50.3	23.9
CO	32.6	-21.1	0.07	0.50	33.1	12.0
SOx	0.0022	-0.0010	0.0000	0.0027	0.0049	0.0038
TSP	262	-151	4.04	2.93	269	118
PM10	87.3	-54.5	0.76	0.68	88.8	34.3
PM2.5	14.4	-12.5	0.18	0.25	14.8	2.38
CO2	9,900	-4,978	28.3	0.14	9,929	4,951

2008 Emissions from Processing Plant Area

360,117 tons produced in 2008

EMISSION SOURCE / OPERATION / ACTIVITY	DEVICE ID #	CRITERIA EMISSIONS (tons per year)							
		TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	90,010	-	-	-	-	-	-	-	-
BLASTING	90,011	-	-	-	-	-	-	-	-
EXPLOSIVES	90,011	-	-	-	-	-	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	90012a	0.10	0.05	0.02	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	90006,7,8,9	0.00	0.00	0.00	-	-	-	-	-
Ball Mill #1	2,002	0.93	0.06	0.02	-	-	-	-	-
Tertiary Crushing	757	19.09	1.24	0.38	-	-	-	-	-
Roller Mill #1	763	1.99	0.13	0.04	-	-	-	-	-
Roller Mill #2	763	1.46	0.09	0.03	-	-	-	-	-
Roller Mill #3	3,935	0.89	0.06	0.02	-	-	-	-	-
Roller Mill #4	7,674	0.88	0.06	0.02	-	-	-	-	-
Surface Treating Plant	2,003	0.01	0.00	0.00	-	-	-	-	-
Rock Storage System/Plan	754	10.77	3.01	0.94	-	-	-	-	-
Optical Sorter	763	0.01	0.01	0.00	-	-	-	-	-
Coarse Product Storage System	2,009	0.27	0.04	0.01	-	-	-	-	-
Silo 81-70c	4,967	0.32	0.05	0.01	-	-	-	-	-
Bulk Loadout 82 System	2,007	0.09	0.01	0.00	-	-	-	-	-
Bulk Loadout 83 System	2,009	0.02	0.00	0.00	-	-	-	-	-
STOCKPILES - WIND EROSION	90,015	1.06	0.53	0.21	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	VARIOUS	0.03	0.03	0.03	0.07	0.26	0.00	0.00	0.07
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	90001,2								
PAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	90,013	16.99	5.01	0.77	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	90014a	11.25	5.62	2.25	-	-	-	-	-
	GRAND TOTAL	66.15	16.01	4.75	0.07	0.26	0.00	0.00	0.07

2008 Emissions from Sentinel-Butterfield Quarry Area

449,672 tons excavated in 2008

EMISSION SOURCE / OPERATION / ACTIVITY	DEVICE ID #	CRITERIA EMISSIONS (tons per year)							
		TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	90,010	0.22	0.18	0.18	-	-	-	-	-
BLASTING	90,011	10.42	5.42	0.31	-	-	-	-	-
EXPLOSIVES	30,502,514	-	-	-	2.95	0.75	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	90,012	0.05	0.02	0.01	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	90006,7,8,9	0.28	0.14	0.04	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	751	6.08	1.06	0.33	-	-	-	-	-
STOCKPILES - WIND EROSION	90,015	0.67	0.34	0.13	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	VARIOUS	0.03	0.03	0.03	0.08	0.38	0.03	0.03	0.00
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	90001,2								
UNPAVED ROADS - ENTRAINED DUST	90,013								
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	90,014	20.10	10.05	4.02	-	-	-	-	-
	GRAND TOTAL	37.84	17.23	5.05	3.03	1.12	0.03	0.03	0.00

2008 Emissions from White Knob Quarry Area

243,036 tons excavated in 2008

EMISSION SOURCE / OPERATION / ACTIVITY	DEVICE ID #	CRITERIA EMISSIONS (tons per year)							
		TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	90,010	0.12	0.10	0.10	-	-	-	-	-
BLASTING	90,011	2.84	1.47	0.09	-	-	-	-	-
EXPLOSIVES	90,011	-	-	-	1.94	0.49	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	90012a	11.01	5.35	1.64	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	90006,7,8,9	0.87	0.42	0.13	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	2,456	6.20	2.01	0.63	-	-	-	-	-
STOCKPILES - WIND EROSION	90,015	0.18	0.09	0.04	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	VARIOUS								
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	90001,2								
UNPAVED ROADS - ENTRAINED DUST	90,013								
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	90014a	20.66	10.33	4.13	-	-	-	-	-
	GRAND TOTAL	41.88	19.78	6.75	1.94	0.49	-	-	-

Notes: There are no paved roads on-site. Exhaust from stationary and portable equipment excludes White Knob generator which is calculated elsewhere. Exhaust from mobile/vehicular equipment and travel on unpaved roads is calculated elsewhere. Wind erosion is not expected to change because the active area that is disturbed on a daily basis will not change with project.

Baseline Emissions from Processing Plant Area

653,635 tons produced in Baseline

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	-	-	-	-	-	-	-	-	-
BLASTING	-	-	-	-	-	-	-	-	-
EXPLOSIVES	-	-	-	-	-	-	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	1.82	0.185	0.090	0.028	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	1.82	0.0072	0.0035	0.0011	-	-	-	-	-
Ball Mill #1	1.82	1.68	0.106	0.033	-	-	-	-	-
Tertiary Crushing	1.82	34.7	2.25	0.69	-	-	-	-	-
Roller Mill #1	1.82	3.61	0.242	0.076	-	-	-	-	-
Roller Mill #2	1.82	2.66	0.167	0.052	-	-	-	-	-
Roller Mill #3	1.82	1.62	0.104	0.033	-	-	-	-	-
Roller Mill #4	1.82	1.60	0.104	0.033	-	-	-	-	-
Surface Treating Plant	1.82	0.011	0.0010	0.0003	-	-	-	-	-
Rock Storage System/Plan	1.82	19.5	5.47	1.71	-	-	-	-	-
Optical Sorter	1.82	0.019	0.014	0.004	-	-	-	-	-
Coarse Product Storage System	1.82	0.48	0.080	0.025	-	-	-	-	-
Silo 81-70c	1.82	0.58	0.082	0.026	-	-	-	-	-
Bulk Loadout 82 System	1.82	0.16	0.025	0.008	-	-	-	-	-
Bulk Loadout 83 System	1.82	0.028	0.005	0.001	-	-	-	-	-
STOCKPILES - WIND EROSION	1.00	1.06	0.53	0.21	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	1.82	0.047	0.046	0.046	0.12	0.48	0.01	0.01	0.13
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
PAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	1.82	30.84	9.10	1.40	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	1.00	11.25	5.62	2.25	-	-	-	-	-
		110.03	24.04	6.62	0.12	0.48	0.01	0.01	0.13

Baseline Emissions from Sentinel-Butterfield Quarry Area

624,191 tons excavated in Baseline

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	1.39	0.31	0.25	0.25	-	-	-	-	-
BLASTING	1.39	14.46	7.52	0.43	-	-	-	-	-
EXPLOSIVES	1.39	-	-	-	4.09	1.04	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	2.57	28.27	13.75	4.20	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	1.39	0.39	0.19	0.06	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	1.39	8.43	1.48	0.46	-	-	-	-	-
STOCKPILES - WIND EROSION	1.00	0.67	0.34	0.13	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	1.39	0.04	0.04	0.04	0.11	0.52	0.042	0.037	0.0017
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	1.00	20.10	10.05	4.02	-	-	-	-	-
		72.66	33.61	9.59	4.2	1.6	0.042	0.037	0.0017

Note: Bulldozing scaled based on White Knob Quarry activity level to reflect increased overburden with

Baseline Emissions from White Knob Quarry Area

463,467 tons excavated in Baseline

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	1.91	0.23	0.19	0.19	-	-	-	-	-
BLASTING	1.91	5.41	2.81	0.16	-	-	-	-	-
EXPLOSIVES	1.91	-	-	-	3.71	0.94	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	1.91	20.99	10.21	3.12	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	1.91	1.65	0.81	0.25	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	1.91	11.83	3.83	1.20	-	-	-	-	-
STOCKPILES - WIND EROSION	1.00	0.18	0.09	0.04	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	-	-	-	-	-	-	-	-	-
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	1.00	20.66	10.33	4.13	-	-	-	-	-
		60.96	28.27	9.08	3.71	0.94	-	-	-

Note: Sentinel-Butterfield bulldozing scaled based on White Knob Quarry activity level to reflect increased overburden with project.

Project Plus Baseline Emissions from Processing Plant Area

680,000 tons produced with Project

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	-	-	-	-	-	-	-	-	-
BLASTING	-	-	-	-	-	-	-	-	-
EXPLOSIVES	-	-	-	-	-	-	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	1.89	0.19	0.09	0.03	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	1.89	0.01	0.00	0.00	-	-	-	-	-
Ball Mill #1	1.89	1.75	0.11	0.03	-	-	-	-	-
Tertiary Crushing	1.89	36.05	2.34	0.72	-	-	-	-	-
Roller Mill #1	1.89	3.75	0.25	0.08	-	-	-	-	-
Roller Mill #2	1.89	2.77	0.17	0.05	-	-	-	-	-
Roller Mill #3	1.89	1.68	0.11	0.03	-	-	-	-	-
Roller Mill #4	1.89	1.67	0.11	0.03	-	-	-	-	-
Surface Treating Plant	1.89	0.01	0.00	0.00	-	-	-	-	-
Rock Storage System/Plan	1.89	20.33	5.69	1.78	-	-	-	-	-
Optical Sorter	1.89	0.02	0.01	0.00	-	-	-	-	-
Coarse Product Storage System	1.89	0.50	0.08	0.03	-	-	-	-	-
Silo 81-70c	1.89	0.60	0.09	0.03	-	-	-	-	-
Bulk Loadout 82 System	1.89	0.16	0.03	0.01	-	-	-	-	-
Bulk Loadout 83 System	1.89	0.03	0.00	0.00	-	-	-	-	-
STOCKPILES - WIND EROSION	1.00	1.06	0.53	0.21	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	1.89	0.05	0.05	0.05	0.12	0.50	0.01	0.0054	0.13
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
PAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	1.89	32.08	9.47	1.45	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	1.00	11.25	5.62	2.25	-	-	-	-	-
		113.97	24.77	6.79	0.12	0.50	0.01	0.01	0.13

Project Plus Baseline Emissions from Sentinel-Butterfield Quarry Area

1,487,500 tons excavated with Project

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	3.31	0.74	0.60	0.60	-	-	-	-	-
BLASTING	3.31	34.46	17.92	1.03	-	-	-	-	-
EXPLOSIVES	3.31	-	-	-	9.75	2.47	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	6.12	67.36	32.77	10.01	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	3.31	0.92	0.45	0.14	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	3.31	20.10	3.52	1.09	-	-	-	-	-
STOCKPILES - WIND EROSION	1.00	0.67	0.34	0.13	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	3.31	0.09	0.09	0.09	0.27	1.24	0.10	0.088	0.0041
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	1.00	20.10	10.05	4.02	-	-	-	-	-
		144.44	65.72	17.11	10.02	3.72			

Note: Bulldozing scaled based on White Knob Quarry activity level to reflect increased overburden with p

Project Plus Baseline Emissions from White Knob Quarry Area

- tons excavated with Project

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	-	-	-	-	-	-	-	-	-
BLASTING	-	-	-	-	-	-	-	-	-
EXPLOSIVES	-	-	-	-	-	-	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	-	-	-	-	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	-	-	-	-	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	-	-	-	-	-	-	-	-	-
STOCKPILES - WIND EROSION	-	-	-	-	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	-	-	-	-	-	-	-	-	-
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-

Note: Sentinel-Butterfield bulldozing scaled based on White Knob Quarry activity level to reflect increased overburden with project.

Project Emissions from Processing Plant Area

Project Emissions 26,365 tons change from baseline

EMISSION SOURCE / OPERATION / ACTIVITY	CRITERIA EMISSIONS (tons per year) TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	-	-	-	-	-	-	-	-
BLASTING	-	-	-	-	-	-	-	-
EXPLOSIVES	-	-	-	-	-	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	0.01	0.00	0.00	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	0.00	0.00	0.00	-	-	-	-	-
Ball Mill #1	0.07	0.00	0.00	-	-	-	-	-
Tertiary Crushing	1.40	0.09	0.03	-	-	-	-	-
Roller Mill #1	0.15	0.01	0.00	-	-	-	-	-
Roller Mill #2	0.11	0.01	0.00	-	-	-	-	-
Roller Mill #3	0.07	0.00	0.00	-	-	-	-	-
Roller Mill #4	0.06	0.00	0.00	-	-	-	-	-
Surface Treating Plant	0.00	0.00	0.00	-	-	-	-	-
Rock Storage System/Plan	0.79	0.22	0.07	-	-	-	-	-
Optical Sorter	0.00	0.00	0.00	-	-	-	-	-
Coarse Product Storage System	0.02	0.00	0.00	-	-	-	-	-
Silo 81-70c	0.02	0.00	0.00	-	-	-	-	-
Bulk Loadout 82 System	0.01	0.00	0.00	-	-	-	-	-
Bulk Loadout 83 System	0.00	0.00	0.00	-	-	-	-	-
STOCKPILES - WIND EROSION	-	-	-	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.01
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-
PAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	1.24	0.37	0.06	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	-	-	-	-	-	-	-	-
	3.94	0.72	0.17	0.00	0.02	0.00	0.00	0.01

Project Emissions from Sentinel-Butterfield Quarry Area

Project Emissions 863,309 tons change from baseline

EMISSION SOURCE / OPERATION / ACTIVITY	CRITERIA EMISSIONS (tons per year) TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	0.43	0.35	0.35	-	-	-	-	-
BLASTING	20.00	10.40	0.60	-	-	-	-	-
EXPLOSIVES	-	-	-	5.66	1.44	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	39.10	19.02	5.81	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	0.53	0.26	0.08	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	11.66	2.04	0.63	-	-	-	-	-
STOCKPILES - WIND EROSION	-	-	-	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	0.05	0.05	0.05	0.16	0.72	0.06	0.05	0.00
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	-	-	-	-	-	-	-	-
	71.78	32.12	7.52	5.82	2.16	-0.04	-0.04	-0.00

roject.

Project Emissions from White Knob Quarry Area

Project Emissions -463,467 tons change from baseline

EMISSION SOURCE / OPERATION / ACTIVITY	CRITERIA EMISSIONS (tons per year) TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	-0.23	-0.19	-0.19	-	-	-	-	-
BLASTING	-5.41	-2.81	-0.16	-	-	-	-	-
EXPLOSIVES	-	-	-	-3.71	-0.94	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	-20.99	-10.21	-3.12	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	-1.65	-0.81	-0.25	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	-11.83	-3.83	-1.20	-	-	-	-	-
STOCKPILES - WIND EROSION	-0.18	-0.09	-0.04	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	-	-	-	-	-	-	-	-
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	-20.66	-10.33	-4.13	-	-	-	-	-
	-60.96	-28.27	-9.08	-3.71	-0.94	-	-	-

Baseline

	VOL1	WK Crusher		VOL2	WK Pit		VOL3	WR Pit	
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	1,002,598.38	10,025.98	1,671.00	1,320,206.27	13,202.06	2,200.34	-	-	-
HC (lb)	640.25	6.40	1.07	554.35	5.54	0.92	-	-	-
NOx (lb)	9,898.01	98.98	16.50	8,146.06	81.46	13.58	-	-	-
PM (lb)	327.63	3.28	0.55	358.76	3.59	0.60	-	-	-
CO (lb)	14,200.65	142.01	23.67	5,306.16	53.06	8.84	-	-	-
SOx (lb)	0.31	0.00	0.00	0.29	0.00	0.00	-	-	-
CO2 (tons)	583.94	5.84	0.97	768.93	7.69	1.28	-	-	-

Project

	VOL1	WK Crusher		VOL2	WK Pit		VOL3	WR Pit	
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	-	-	-	-	-	-	-	-	-
HC (lb)	-	-	-	-	-	-	-	-	-
NOx (lb)	-	-	-	-	-	-	-	-	-
PM (lb)	-	-	-	-	-	-	-	-	-
CO (lb)	-	-	-	-	-	-	-	-	-
SOx (lb)	-	-	-	-	-	-	-	-	-
CO2 (tons)	-	-	-	-	-	-	-	-	-

Increment

	VOL1	WK Crusher		VOL2	WK Pit		VOL3	WR Pit	
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	-1,002,598.38	-10,025.98	-1,671.00	-1,320,206.27	-13,202.06	-2,200.34	-	-	-
HC (lb)	-640.25	-6.40	-1.07	-554.35	-5.54	-0.92	-	-	-
NOx (lb)	-9,898.01	-98.98	-16.50	-8,146.06	-81.46	-13.58	-	-	-
PM (lb)	-327.63	-3.28	-0.55	-358.76	-3.59	-0.60	-	-	-
CO (lb)	-14,200.65	-142.01	-23.67	-5,306.16	-53.06	-8.84	-	-	-
SOx (lb)	-0.31	-0.00	-0.00	-0.29	-0.00	-0.00	-	-	-
CO2 (tons)	-583.94	-5.84	-0.97	-768.93	-7.69	-1.28	-	-	-

Baseline

	VOL4	OB1		VOL5	OB2		VOL6	Plant		VOL7	BF Pit	
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	38,829.60	388.30	64.72	38,829.60	388.30	64.72	1,050,976.27	10,509.76	1,751.63	271,610.60	2,716.11	452.68
HC (lb)	16.30	0.16	0.03	16.30	0.16	0.03	578.23	5.78	0.96	114.05	1.14	0.19
NOx (lb)	239.59	2.40	0.40	239.59	2.40	0.40	4,316.04	43.16	7.19	1,675.92	16.76	2.79
PM (lb)	10.55	0.11	0.02	10.55	0.11	0.02	396.46	3.96	0.66	73.81	0.74	0.12
CO (lb)	156.06	1.56	0.26	156.06	1.56	0.26	2,764.55	27.65	4.61	1,091.65	10.92	1.82
SOx (lb)	0.01	0.00	0.00	0.01	0.00	0.00	0.14	0.00	0.00	0.06	0.00	0.00
CO2 (tons)	22.62	0.23	0.04	22.62	0.23	0.04	612.12	6.12	1.02	158.19	1.58	0.26

Project

	VOL4	OB1		VOL5	OB2		VOL6	Plant		VOL7	BF Pit	
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	-	-	-	-	-	-	1,093,368.41	10,933.68	1,822.28	#########	10,155.06	1,692.51
HC (lb)	-	-	-	-	-	-	601.55	6.02	1.00	457.65	4.58	0.76
NOx (lb)	-	-	-	-	-	-	4,490.13	44.90	7.48	6,751.67	67.52	11.25
PM (lb)	-	-	-	-	-	-	412.45	4.12	0.69	309.68	3.10	0.52
CO (lb)	-	-	-	-	-	-	2,876.06	28.76	4.79	3,913.57	39.14	6.52
SOx (lb)	-	-	-	-	-	-	0.15	0.00	0.00	0.22	0.00	0.00
CO2 (tons)	-	-	-	-	-	-	636.81	6.37	1.06	591.46	5.91	0.99

Increment

	VOL4	OB1		VOL5	OB2		VOL6	Plant		VOL7	BF Pit	
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	-38,829.60	-388.30	-64.72	-38,829.60	-388.30	-64.72	42,392.14	423.92	70.65	743,895.44	7,438.95	1,239.83
HC (lb)	-16.30	-0.16	-0.03	-16.30	-0.16	-0.03	23.32	0.23	0.04	343.60	3.44	0.57
NOx (lb)	-239.59	-2.40	-0.40	-239.59	-2.40	-0.40	174.09	1.74	0.29	5,075.75	50.76	8.46
PM (lb)	-10.55	-0.11	-0.02	-10.55	-0.11	-0.02	15.99	0.16	0.03	235.87	2.36	0.39
CO (lb)	-156.06	-1.56	-0.26	-156.06	-1.56	-0.26	111.51	1.12	0.19	2,821.92	28.22	4.70
SOx (lb)	-0.01	-0.00	-0.00	-0.01	-0.00	-0.00	0.01	0.00	0.00	0.16	0.00	0.00
CO2 (tons)	-22.62	-0.23	-0.04	-22.62	-0.23	-0.04	24.69	0.25	0.04	433.27	4.33	0.72

Baseline

	VOL8	B5		VOL9	SB Crusher		VOL10	Sen Pit		Total		
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	104,590.39	1,045.90	174.32	209,180.78	2,091.81	348.63	1,506,426.05	15,064.26	2,510.71	5,543,247.93	55,432.48	9,238.75
HC (lb)	43.92	0.44	0.07	87.83	0.88	0.15	632.55	6.33	1.05	2,683.79	26.84	4.47
NOx (lb)	645.35	6.45	1.08	1,290.71	12.91	2.15	9,295.09	92.95	15.49	35,746.35	357.46	59.58
PM (lb)	28.42	0.28	0.05	56.84	0.57	0.09	409.36	4.09	0.68	1,672.38	16.72	2.79
CO (lb)	420.37	4.20	0.70	840.74	8.41	1.40	6,054.61	60.55	10.09	30,990.85	309.91	51.65
SOx (lb)	0.02	0.00	0.00	0.05	0.00	0.00	0.33	0.00	0.00	1.22	0.01	0.00
CO2 (tons)	60.92	0.61	0.10	121.83	1.22	0.20	877.39	8.77	1.46	3,228.55	32.29	5.38

Project

	VOL8	B5		VOL9	SB Crusher		VOL10	Sen Pit		Total		
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	249,247.62	2,492.48	415.41	2,583,350.22	25,833.50	4,305.58	3,221,703.57	32,217.04	5,369.51	8,163,175.86	81,631.76	13,605.29
HC (lb)	104.66	1.05	0.17	417.81	4.18	0.70	1,352.79	13.53	2.25	2,934.46	29.34	4.89
NOx (lb)	1,537.93	15.38	2.56	8,383.09	83.83	13.97	19,878.85	198.79	33.13	41,041.67	410.42	68.40
PM (lb)	67.73	0.68	0.11	316.39	3.16	0.53	875.47	8.75	1.46	1,981.72	19.82	3.30
CO (lb)	1,001.77	10.02	1.67	8,277.55	82.78	13.80	12,948.63	129.49	21.58	29,017.60	290.18	48.36
SOx (lb)	0.06	0.00	0.00	0.78	0.01	0.00	0.71	0.01	0.00	1.92	0.02	0.00
CO2 (tons)	145.17	1.45	0.24	927.84	9.28	1.55	1,876.41	18.76	3.13	4,177.70	41.78	6.96

Increment

	VOL8	B5		VOL9	SB Crusher		VOL10	Sen Pit				
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	144,657.23	1,446.57	241.10	2,374,169.44	23,741.69	3,956.95	1,715,277.52	17,152.78	2,858.80	2,619,927.93	26,199.28	4,366.55
HC (lb)	60.74	0.61	0.10	329.97	3.30	0.55	720.24	7.20	1.20	250.67	2.51	0.42
NOx (lb)	892.58	8.93	1.49	7,092.39	70.92	11.82	10,583.76	105.84	17.64	5,295.32	52.95	8.83
PM (lb)	39.31	0.39	0.07	259.54	2.60	0.43	466.11	4.66	0.78	309.34	3.09	0.52
CO (lb)	581.40	5.81	0.97	7,436.82	74.37	12.39	6,894.02	68.94	11.49	-1,973.26	-19.73	-3.29
SOx (lb)	0.03	0.00	0.00	0.73	0.01	0.00	0.38	0.00	0.00	0.70	0.01	0.00
CO2 (tons)	84.25	0.84	0.14	806.01	8.06	1.34	999.03	9.99	1.67	949.15	9.49	1.58

Baseline Offroad Activity		**Baseline Fleet Characteristics**					
	Avg. (hp-hr)	HC (lb/yr)	NOx (lb/yr)	PM (lb/yr)	CO (lb/yr)	SOx (lb/yr)	CO2 (tpy)
Pit Subtotal	3,644,992	1,643	24,234	1,112	14,047	0.81	2,123
Plant Subtotal	1,050,976	624	3,785	325	2,668	0.15	612
Roads Subtotal	17,158,834	6,706	115,562	4,059	111,011	3.99	9,994
Total w/o Generator	21,854,802	8,973	143,581	5,495	127,726	4.95	12,729
Total w/ Generator	22,702,082	9,548	152,520	5,781	141,303	5.22	13,222
Generator	847,280	575	8,940	285	13,576	0.27	493

Baseline Offroad Activity		**2012 Fleet Characteristics**					
	Avg. (hp-hr)	HC (lb/yr)	NOx (lb/yr)	PM (lb/yr)	CO (lb/yr)	SOx (lb/yr)	CO2 (tpy)
Pit Subtotal	3,644,992	1,531	22,491	990	14,650	0.81	2,123
Plant Subtotal	1,041,576	578	4,316	396	2,765	0.14	612
Roads Subtotal	17,158,834	5,186	95,767	2,990	62,474	3.99	9,994
Total w/o Generator	21,845,402	7,294	122,573	4,377	79,888	4.94	12,729
Total w/ Generator	22,692,682	7,869	131,513	4,663	93,464	5.21	13,222

Baseline Pit Activity Allocations

	Ton Excavated	hp-hr	Pit (hp-hr)	Fill (hp-hr)	Loadout (hp-hr)
White Knob	463,467	1,553,184	1,320,206	77,659	155,318
Sentinel	528,841	1,772,266	1,506,426	88,613	177,227
Butterfield	95,351	319,542	271,611	15,977	31,954
	1,087,658	3,644,992	3,098,243	182,250	364,499

Project Pit Activity Allocations

	Ton Excavated	hp-hr	Pit (hp-hr)	Fill (hp-hr)	Loadout (hp-h	Percentage
White Knob	-	-				
Sentinel	1,131,000	3,790,239	3,221,704	189,512	379,024	76%
Butterfield	356,500	1,194,713	1,015,506	59,736	119,471	24%
	1,487,500	4,984,952	4,237,210	249,248	498,495	

Project Offroad Activity		**Baseline Fleet Characteristics**					
	Avg. (hp-hr)	HC (lb/yr)	NOx (lb/yr)	PM (lb/yr)	CO (lb/yr)	SOx (lb/yr)	CO2 (tpy)
Pit Subtotal	4,984,952	2,093	30,759	1,355	20,035	1.10	2,903
Plant Subtotal	1,093,368	607	4,531	416	2,902	0.15	643
Roads Subtotal	24,029,854	7,262	134,115	4,188	87,490	5.58	13,996
Mobile Crusher	2,084,855	208	5,307	181	6,274	0.67	638
Total	32,193,030	10,171	174,712	6,140	116,702	7.50	18,179
Increment	9,500,348	2,301	43,199	1,477	23,237	2.30	4,957

Mobile Crusher

Tier 3 E.F. (g/hp-hr)	(CalEEMod 201	0.12	2.32	0.088	2.6	0.000276	528.4
Fuel Correction Factor		0.720	0.948	0.852	1	1	1
0.525	load factor						

10% of Pit Subtotal assumed to be loading at plant
5% of Pit Subtotal assumed to be placement of fill
85% of Pit Subtotal assumed to be excavation
100 maximum days are used to estimate daily emissions from annual activity levels
6 maximum hours are assumed to occur on the maximum day in order to determine peak hour

Activity Data								Vehicle Miles Traveled per Year						
Locaiton	**Tons/Year**	**Tons/Day**	**Tons/Hour**	**Trips/Year**	**Trips/Day**	**Trips/Hour**	**Links Traveled**	**A - Butterfield Pit**	**B - Waste Pile**	**C - West Road**	**D - Not Used**	**E - Senteniel Pit**	**F - Not Used**	**G - Sentinel/Butterfield to Plant**
Ore to Primary Crusher								4,065	1,800	1,460	-	6,045	-	38,000
Sentinel	606,769	3,805	457	16,181	101	12	E	-	-	-	-	18,525	-	-
Butterfield 3	190,531	1,195	143	5,081	32	4	A, C	3,912		1,405	-	-	-	-
White Knob	-	-	-	-	-	-	J	-	-	-	-	-	-	-
Sentinel - Butterfield	797,300	5,000	600	21,261	133	16	-							
TOTAL	797,300	5,000	600	21,261	133	16	-							
Ore Hauled to Plant									-					
Sentinel	517,500	3,245	389	13,800	87	10	G, I	-	-	-	-	-	-	99,318
Butterfield 3	162,500	1,019	122	4,333	27	3	G, I	-	-	-	-	-	-	31,187
White Knob	-	-	-	-	-	-	H, L, I	-	-	-	-	-	-	-
Sentinel - Butterfield	680,000	4,264	512	18,133	114	14	-							
TOTAL	680,000	4,264	512	18,133	114	14	-							
Waste Crusher Fines														
Sentinel	89,269	560	67	2,381	15	2	B, C	-	812	658	-	-	-	-
Butterfield 3	28,031	176	21	748	5	1	B, C	-	255	207	-	-	-	-
White Knob	-	-	-	-	-	-	L	-	-	-	-	-	-	-
Sentinel - Butterfield	117,300	736	88	3,128	20	2	-							
TOTAL	117,300	736	88	3,128	20	2	-							
Waste Rock Not Processed														
Sentinel	524,231	3,294	395	13,980	88	11	B, C, E	-	4,766	3,866	-	16,005	-	-
Butterfield 3	165,969	1,034	124	4,426	28	3	A, B	3,407	1,509	-	-	-	-	-
White Knob	-	-	-	-	-	-	J, L	-	-	-	-	-	-	-
Sentinel - Butterfield	690,200	4,328	519	18,405	115	14	-							
TOTAL	690,200	4,328	519	18,405	115	14	-							
	1,487,500	tons, total excavated						A	B	C	D	E	F	G
Total VMT:	not used on this page.							7,319	7,341	6,135	-	34,530	-	130,505
% of VMT:	not used on this page.							4%	4%	3%	0%	18%	0%	70%

			Activity Data	Vehicle Miles Traveled per Year					
Locaiton	**Tons/Year**	**Tons/Day**	**Tons/Hour**	**H - White Ridge to Plant**	**I - Plant Feed**	**J - White Knob Pit**	**K - On-Road Trucks**	**L - Crusher to White Ridge**	**M - White Ridge Pit**
Ore to Primary Crusher				24,260	365	3,725	6,186	2,300	1,300
Sentinel	606,769	3,805	457	-	-	-	-	-	-
Butterfield 3	190,531	1,195	143	-	-	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	797,300	5,000	600		-	-		-	-
TOTAL	797,300	5,000	600		-	-		-	-
Ore Hauled to Plant						-		-	-
Sentinel	517,500	3,245	389	-	954	-	-	-	-
Butterfield 3	162,500	1,019	122	-	300	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	680,000	4,264	512			-		-	-
TOTAL	680,000	4,264	512			-	28,453	-	-
Waste Crusher Fines						-		-	-
Sentinel	89,269	560	67	-	-	-	-	-	-
Butterfield 3	28,031	176	21	-	-	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	117,300	736	88			-		-	-
TOTAL	117,300	736	88			-		-	-
Waste Rock Not Processed						-		-	-
Sentinel	524,231	3,294	395	-	-	-	-	-	-
Butterfield 3	165,969	1,034	124	-	-	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	690,200	4,328	519			-		-	-
TOTAL	690,200	4,328	519						
	1,487,500	tons, total excavated		H	I	J	K	L	M
Total VMT:	not used on this page.			-	1,254	-	28,453	-	-
% of VMT:	not used on this page.			0%	1%	0%		0%	0%

			Activity Data	Vehicle Miles Traveled per Day						
Locaiton	**Tons/Year**	**Tons/Day**	**Tons/Hour**	**A - Butterfield Pit**	**B - Waste Pile**	**C - West Road**	**D - Not Used**	**E - Senteniel Pit**	**F - Not Used**	**G - Sentinel/ Butterfield to Plant**
Ore to Primary Crusher				4,065	1,800	1,460	-	6,045	-	38,000
Sentinel	606,769	3,805	457	-	-	-	-	116.17	-	-
Butterfield 3	190,531	1,195	143	24.53		8.81	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	797,300	5,000	600							
TOTAL	797,300	5,000	600							
Ore Hauled to Plant										
Sentinel	517,500	3,245	389	-	-	-	-	-	-	622.84
Butterfield 3	162,500	1,019	122	-	-	-	-	-	-	195.58
White Knob	-	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	680,000	4,264	512							
TOTAL	680,000	4,264	512							
Waste Crusher Fines										
Sentinel	89,269	560	67	-	5.09	4.13	-	-	-	-
Butterfield 3	28,031	176	21	-	1.60	1.30	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	117,300	736	88							
TOTAL	117,300	736	88							
Waste Rock Not Processed										
Sentinel	524,231	3,294	395	-	29.95	24.29	-	100.57	-	-
Butterfield 3	165,969	1,034	124	21.24	9.40	-	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	690,200	4,328	519							
TOTAL	690,200	4,328	519							
	1,487,500	tons, total excavated		A	B	C	D	E	F	G
Total VMT:	not used on this page.			46	46	39	-	217	-	818
% of VMT:	not used on this page.			4%	4%	3%	0%	18%	0%	70%

			Activity Data	Vehicle Miles Traveled per Day					
Locaiton	**Tons/Year**	**Tons/Day**	**Tons/Hour**	**H - White Ridge to Plant**	**I - Plant Feed**	**J - White Knob Pit**	**K - On-Road Trucks**	**L - Crusher to White Ridge**	**M - White Ridge Pit**
Ore to Primary Crusher				24,260	365	3,725	6,186	2,300	1,300
Sentinel	606,769	3,805	457	-	-	-	-	-	-
Butterfield 3	190,531	1,195	143	-	-	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	797,300	5,000	600						
TOTAL	797,300	5,000	600						
Ore Hauled to Plant									
Sentinel	517,500	3,245	389	-	5.98	-	-	-	-
Butterfield 3	162,500	1,019	122	-	1.88	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	680,000	4,264	512						
TOTAL	680,000	4,264	512				178.43		
Waste Crusher Fines									
Sentinel	89,269	560	67	-	-	-	-	-	-
Butterfield 3	28,031	176	21	-	-	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	117,300	736	88						
TOTAL	117,300	736	88						
Waste Rock Not Processed									
Sentinel	524,231	3,294	395	-	-	-	-	-	-
Butterfield 3	165,969	1,034	124	-	-	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	690,200	4,328	519						
TOTAL	690,200	4,328	519						
	1,487,500	tons, total excavated		H	I	J	K	L	M
Total VMT:	not used on this page.			-	8	-	178	-	-
% of VMT:	not used on this page.			0%	1%	0%		0%	0%

			Activity Data	Vehicle Miles Traveled per Hour						
Locaiton	**Tons/Year**	**Tons/Day**	**Tons/Hour**	**A - Butterfield Pit**	**B - Waste Pile**	**C - West Road**	**D - Not Used**	**E - Senteniel Pit**	**F - Not Used**	**G - Sentinel/ Butterfield to Plant**
Ore to Primary Crusher				4,065	1,800	1,460	-	6,045	-	38,000
Sentinel	606,769	3,805	457	-	-	-	-	13.94	-	-
Butterfield 3	190,531	1,195	143	2.94		1.06	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	797,300	5,000	600							
TOTAL	797,300	5,000	600							
Ore Hauled to Plant										
Sentinel	517,500	3,245	389	-	-	-	-	-	-	74.74
Butterfield 3	162,500	1,019	122	-	-	-	-	-	-	23.47
White Knob	-	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	680,000	4,264	512							
TOTAL	680,000	4,264	512							
Waste Crusher Fines										
Sentinel	89,269	560	67	-	0.61	0.50	-	-	-	-
Butterfield 3	28,031	176	21	-	0.19	0.16	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	117,300	736	88							
TOTAL	117,300	736	88							
Waste Rock Not Processed										
Sentinel	524,231	3,294	395	-	3.59	2.91	-	12.07	-	-
Butterfield 3	165,969	1,034	124	2.55	1.13	-	-	-	-	-
White Knob	-	-	-	-	-	-	-	-	-	-
Sentinel - Butterfield	690,200	4,328	519							
TOTAL	690,200	4,328	519							
	1,487,500	tons, total excavated		A	B	C	D	E	F	G
Total VMT:	not used on this page.			5.49	5.52	4.62	-	26.01	-	98.21
% of VMT:	not used on this page.			4%	4%	3%	0%	18%	0%	70%

			Activity Data	Vehicle Miles Traveled per Hour						Off-site
Locaiton	Tons/Year	Tons/Day	Tons/Hour	H - White Ridge to Plant	I - Plant Feed	J - White Knob Pit	K - On-Road Trucks	L - Crusher to White Ridge	M - White Ridge Pit	per Year
Ore to Primary Crusher				24,260	365	3,725	6,186	2,300	1,300	
Sentinel	606,769	3,805	457	-	-	-	-	-	-	
Butterfield 3	190,531	1,195	143	-	-	-	-	-	-	
White Knob	-	-	-	-	-	-	-	-	-	
Sentinel - Butterfield	797,300	5,000	600							
TOTAL	797,300	5,000	600							
Ore Hauled to Plant										
Sentinel	517,500	3,245	389	-	0.72	-	-	-	-	
Butterfield 3	162,500	1,019	122	-	0.23	-	-	-	-	
White Knob	-	-	-	-	-	-	-	-	-	
Sentinel - Butterfield	680,000	4,264	512							
TOTAL	680,000	4,264	512				21.41			3940736
Waste Crusher Fines										
Sentinel	89,269	560	67	-	-	-	-	-	-	
Butterfield 3	28,031	176	21	-	-	-	-	-	-	
White Knob	-	-	-	-	-	-	-	-	-	
Sentinel - Butterfield	117,300	736	88							
TOTAL	117,300	736	88							
Waste Rock Not Processed										
Sentinel	524,231	3,294	395	-	-	-	-	-	-	
Butterfield 3	165,969	1,034	124	-	-	-	-	-	-	
White Knob	-	-	-	-	-	-	-	-	-	
Sentinel - Butterfield	690,200	4,328	519							
TOTAL	690,200	4,328	519							
	1,487,500	tons, total excavated		H	I	J	K	L	M	
Total VMT:	not used on this page.			-	0.94	-	21.41	-	-	
% of VMT:	not used on this page.			0%	1%	0%		0%	0%	

Baseline

	A			B		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,618.07	15.34	1.84	962.78	11.05	1.33
VMT (%)	1.21%	0.99%	1.05%	0.72%	0.71%	0.76%
TSP - Dust	6,018.41	57.06	6.85	3,581.04	41.09	4.93
PM10 - Dust	1,711.42	16.23	1.95	1,018.32	11.68	1.40
PM2.5 - Dust	171.14	1.62	0.19	101.83	1.17	0.14
TSP - Exhaust	36.22	0.34	0.04	21.55	0.25	0.03
PM10 - Exhaust	36.22	0.34	0.04	21.55	0.25	0.03
PM2.5 - Exhaust	33.32	0.32	0.04	19.83	0.23	0.03
HC	62.81	0.60	0.07	37.37	0.43	0.05
NOx	1,160	11.00	1.32	690	7.92	0.95
CO	757	7.17	0.86	450	5.17	0.62
SOx	0.05	0.00	0.00	0.03	0.00	0.00
CO2	121.05	-	-	72.03	-	-

Project 1.40 scale factor from Project VMT/yr over Baseline VMT/yr

	A			B		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	7,319.05	45.77	5.49	7,340.91	46.04	5.52
VMT (%)	3.91%	3.90%	3.90%	3.92%	3.92%	3.92%
TSP - Dust	27,223.18	170.23	20.43	27,304.48	171.23	20.55
PM10 - Dust	7,741.29	48.41	5.81	7,764.41	48.69	5.84
PM2.5 - Dust	774.13	4.84	0.58	776.44	4.87	0.58
TSP - Exhaust	163.84	1.02	0.12	164.33	1.03	0.12
PM10 - Exhaust	163.84	1.02	0.12	164.33	1.03	0.12
PM2.5 - Exhaust	150.73	0.94	0.11	151.18	0.95	0.11
HC	284.11	1.78	0.21	284.96	1.79	0.21
NOx	5,246.83	32.81	3.94	5,262.50	33.00	3.96
CO	3,422.78	21.40	2.57	3,433.00	21.53	2.58
SOx	0.22	0.00	0.00	0.22	0.00	0.00
CO2 (tons)	547.54	-	-	549.17	-	-

Increment

	A			B		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	5,700.98	30.42	3.65	6,378.13	34.99	4.20
TSP - Dust	21,204.77	113.16	13.58	23,723.43	130.15	15.62
PM10 - Dust	6,029.87	32.18	3.86	6,746.09	37.01	4.44
PM2.5 - Dust	602.99	3.22	0.39	674.61	3.70	0.44
TSP - Exhaust	127.62	0.68	0.08	142.78	0.78	0.09
PM10 - Exhaust	127.62	0.68	0.08	142.78	0.78	0.09
PM2.5 - Exhaust	117.41	0.63	0.08	131.35	0.72	0.09
HC	221.30	1.18	0.14	247.58	1.36	0.16
NOx	4,086.88	21.81	2.62	4,572.31	25.08	3.01
CO	2,666.08	14.23	1.71	2,982.75	16.36	1.96
SOx	0.17	0.00	0.00	0.19	0.00	0.00
CO2 (tons)	426.49	-	-	477.15	-	-

Baseline

	C			D		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,355.33	16.39	1.97	-	-	-
VMT (%)	1.01%	1.05%	1.13%	0.00%	0.00%	0.00%
TSP - Dust	5,041.15	60.95	7.31	-	-	-
PM10 - Dust	1,433.52	17.33	2.08	-	-	-
PM2.5 - Dust	143.35	1.73	0.21	-	-	-
TSP - Exhaust	30.34	0.37	0.04	-	-	-
PM10 - Exhaust	30.34	0.37	0.04	-	-	-
PM2.5 - Exhaust	27.91	0.34	0.04	-	-	-
HC	52.61	0.64	0.08	-	-	-
NOx	972	11.75	1.41	-	-	-
CO	634	7.66	0.92	-	-	-
SOx	0.04	0.00	0.00	-	-	-
CO2	101.39	-	-	-	-	-

Project

	C			D		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	6,135.41	38.52	4.62	-	-	-
VMT (%)	3.28%	3.28%	3.28%	0.00%	0.00%	0.00%
TSP - Dust	22,820.63	143.29	17.19	-	-	-
PM10 - Dust	6,489.36	40.75	4.89	-	-	-
PM2.5 - Dust	648.94	4.07	0.49	-	-	-
TSP - Exhaust	137.34	0.86	0.10	-	-	-
PM10 - Exhaust	137.34	0.86	0.10	-	-	-
PM2.5 - Exhaust	126.35	0.79	0.10	-	-	-
HC	238.16	1.50	0.18	-	-	-
NOx	4,398.31	27.62	3.31	-	-	-
CO	2,869.24	18.02	2.16	-	-	-
SOx	0.18	0.00	0.00	-	-	-
CO2 (tons)	458.99	-	-	-	-	-

Increment

	C			D		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	4,780.08	22.14	2.66	-	-	-
TSP - Dust	17,779.48	82.34	9.88	-	-	-
PM10 - Dust	5,055.84	23.42	2.81	-	-	-
PM2.5 - Dust	505.58	2.34	0.28	-	-	-
TSP - Exhaust	107.00	0.50	0.06	-	-	-
PM10 - Exhaust	107.00	0.50	0.06	-	-	-
PM2.5 - Exhaust	98.44	0.46	0.05	-	-	-
HC	185.55	0.86	0.10	-	-	-
NOx	3,426.71	15.87	1.90	-	-	-
CO	2,235.42	10.35	1.24	-	-	-
SOx	0.14	0.00	0.00	-	-	-
CO2 (tons)	357.60	-	-	-	-	-

Baseline

	E			F		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	8,012.74	93.45	11.21	-	-	-
VMT (%)	6.00%	6.01%	6.42%	0.00%	0.00%	0.00%
TSP - Dust	29,803.34	347.60	41.71	-	-	-
PM10 - Dust	8,475.00	98.85	11.86	-	-	-
PM2.5 - Dust	847.50	9.88	1.19	-	-	-
TSP - Exhaust	179.37	2.09	0.25	-	-	-
PM10 - Exhaust	179.37	2.09	0.25	-	-	-
PM2.5 - Exhaust	165.02	1.92	0.23	-	-	-
HC	311.04	3.63	0.44	-	-	-
NOx	5,744	66.99	8.04	-	-	-
CO	3,747	43.70	5.24	-	-	-
SOx	0.24	0.00	0.00	-	-	-
CO2	599.43	-	-	-	-	-

Project

	E			F		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	34,529.77	216.74	26.01	-	-	-
VMT (%)	18.46%	18.47%	18.47%	0.00%	0.00%	0.00%
TSP - Dust	128,433.33	806.16	96.74	-	-	-
PM10 - Dust	36,521.81	229.24	27.51	-	-	-
PM2.5 - Dust	3,652.18	22.92	2.75	-	-	-
TSP - Exhaust	772.95	4.85	0.58	-	-	-
PM10 - Exhaust	772.95	4.85	0.58	-	-	-
PM2.5 - Exhaust	711.12	4.46	0.54	-	-	-
HC	1,340.37	8.41	1.01	-	-	-
NOx	24,753.46	155.37	18.64	-	-	-
CO	16,147.95	101.36	12.16	-	-	-
SOx	1.03	0.01	0.00	-	-	-
CO2 (tons)	2,583.16	-	-	-	-	-

Increment

	E			F		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	26,517.04	123.29	14.79	-	-	-
TSP - Dust	98,629.99	458.56	55.03	-	-	-
PM10 - Dust	28,046.81	130.40	15.65	-	-	-
PM2.5 - Dust	2,804.68	13.04	1.56	-	-	-
TSP - Exhaust	593.59	2.76	0.33	-	-	-
PM10 - Exhaust	593.59	2.76	0.33	-	-	-
PM2.5 - Exhaust	546.10	2.54	0.30	-	-	-
HC	1,029.33	4.79	0.57	-	-	-
NOx	19,009.34	88.38	10.61	-	-	-
CO	12,400.77	57.65	6.92	-	-	-
SOx	0.79	0.00	0.00	-	-	-
CO2 (tons)	1,983.73	-	-	-	-	-

Baseline

	G			H		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	72,587.16	815.66	97.88	33,745.62	416.59	41.66
VMT (%)	54.34%	52.46%	56.04%	25.26%	26.79%	23.85%
TSP - Dust	269,987.62	3,033.83	364.06	125,516.67	1,549.49	154.95
PM10 - Dust	76,774.75	862.71	103.53	35,692.42	440.62	44.06
PM2.5 - Dust	7,677.47	86.27	10.35	3,569.24	44.06	4.41
TSP - Exhaust	1,624.87	18.26	2.19	755.40	9.33	0.93
PM10 - Exhaust	1,624.87	18.26	2.19	755.40	9.33	0.93
PM2.5 - Exhaust	1,494.88	16.80	2.02	694.97	8.58	0.86
HC	2,817.67	31.66	3.80	1,309.93	16.17	1.62
NOx	52,036	584.72	70.17	24,191	298.64	29.86
CO	33,946	381.44	45.77	15,781	194.82	19.48
SOx	2.17	0.02	0.00	1.01	0.01	0.00
CO2	5,430.22	-	-	2,524.50	-	-

Project

	G			H		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	130,505.05	818.42	98.21	-	-	-
VMT (%)	69.76%	69.75%	69.75%	0.00%	0.00%	0.00%
TSP - Dust	485,412.92	3,044.10	365.29	-	-	-
PM10 - Dust	138,033.94	865.63	103.88	-	-	-
PM2.5 - Dust	13,803.39	86.56	10.39	-	-	-
TSP - Exhaust	2,921.37	18.32	2.20	-	-	-
PM10 - Exhaust	2,921.37	18.32	2.20	-	-	-
PM2.5 - Exhaust	2,687.66	16.85	2.02	-	-	-
HC	5,065.92	31.77	3.81	-	-	-
NOx	93,555.53	586.70	70.40	-	-	-
CO	61,031.06	382.74	45.93	-	-	-
SOx	3.89	0.02	0.00	-	-	-
CO2 (tons)	9,763.04	-	-	-	-	-

Increment

	G			H		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	57,917.89	2.76	0.33	-33,745.62	-416.59	-41.66
TSP - Dust	215,425.30	10.27	1.23	-125,516.67	-1,549.49	-154.95
PM10 - Dust	61,259.19	2.92	0.35	-35,692.42	-440.62	-44.06
PM2.5 - Dust	6,125.92	0.29	0.04	-3,569.24	-44.06	-4.41
TSP - Exhaust	1,296.50	0.06	0.01	-755.40	-9.33	-0.93
PM10 - Exhaust	1,296.50	0.06	0.01	-755.40	-9.33	-0.93
PM2.5 - Exhaust	1,192.78	0.06	0.01	-694.97	-8.58	-0.86
HC	2,248.24	0.11	0.01	-1,309.93	-16.17	-1.62
NOx	41,519.76	1.98	0.24	-24,191.32	-298.64	-29.86
CO	27,085.46	1.29	0.16	-15,781.23	-194.82	-19.48
SOx	1.73	0.00	0.00	-1.01	-0.01	-0.00
CO2 (tons)	4,332.82	-	-	-2,524.50	-	-

Baseline

	I			J		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,204.93	14.10	1.57	8,719.27	106.44	10.64
VMT (%)	0.90%	0.91%	0.90%	6.53%	6.85%	6.09%
TSP - Dust	4,481.74	52.45	5.83	32,431.27	395.90	39.59
PM10 - Dust	1,274.45	14.92	1.66	9,222.28	112.58	11.26
PM2.5 - Dust	127.44	1.49	0.17	922.23	11.26	1.13
TSP - Exhaust	26.97	0.32	0.04	195.18	2.38	0.24
PM10 - Exhaust	26.97	0.32	0.04	195.18	2.38	0.24
PM2.5 - Exhaust	24.81	0.29	0.03	179.57	2.19	0.22
HC	46.77	0.55	0.06	338.46	4.13	0.41
NOx	864	10.11	1.12	6,251	76.30	7.63
CO	563	6.59	0.73	4,078	49.78	4.98
SOx	0.04	0.00	0.00	0.26	0.00	0.00
CO2	90.14	-	-	652.29	-	-

Project

	I			J		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,253.54	7.86	0.94	-	-	-
VMT (%)	0.67%	0.67%	0.67%	0.00%	0.00%	0.00%
TSP - Dust	4,662.52	29.24	3.51	-	-	-
PM10 - Dust	1,325.85	8.31	1.00	-	-	-
PM2.5 - Dust	132.59	0.83	0.10	-	-	-
TSP - Exhaust	28.06	0.18	0.02	-	-	-
PM10 - Exhaust	28.06	0.18	0.02	-	-	-
PM2.5 - Exhaust	25.82	0.16	0.02	-	-	-
HC	48.66	0.31	0.04	-	-	-
NOx	898.63	5.64	0.68	-	-	-
CO	586.22	3.68	0.44	-	-	-
SOx	0.04	0.00	0.00	-	-	-
CO2 (tons)	93.78	-	-	-	-	-

Increment

	I			J		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	48.60	-6.24	-0.62	-8,719.27	-106.44	-10.64
TSP - Dust	180.78	-23.21	-2.32	-32,431.27	-395.90	-39.59
PM10 - Dust	51.41	-6.60	-0.66	-9,222.28	-112.58	-11.26
PM2.5 - Dust	5.14	-0.66	-0.07	-922.23	-11.26	-1.13
TSP - Exhaust	1.09	-0.14	-0.01	-195.18	-2.38	-0.24
PM10 - Exhaust	1.09	-0.14	-0.01	-195.18	-2.38	-0.24
PM2.5 - Exhaust	1.00	-0.13	-0.01	-179.57	-2.19	-0.22
HC	1.89	-0.24	-0.02	-338.46	-4.13	-0.41
NOx	34.84	-4.47	-0.45	-6,250.60	-76.30	-7.63
CO	22.73	-2.92	-0.29	-4,077.59	-49.78	-4.98
SOx	0.00	-0.00	-0.00	-0.26	-0.00	-0.00
CO2 (tons)	3.64	-	-	-652.29	-	-

Baseline

	K			L		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	20,421.14	239.00	26.56	5,383.71	65.72	6.57
VMT (%)	0.00%	0.00%	0.00%	4.03%	4.23%	3.76%
TSP - Dust	751.91	8.80	0.98	20,024.68	244.45	24.44
PM10 - Dust	150.38	1.76	0.20	5,694.30	69.51	6.95
PM2.5 - Dust	36.91	0.43	0.05	569.43	6.95	0.70
TSP - Exhaust	31.80	0.37	0.04	120.51	1.47	0.15
PM10 - Exhaust	31.80	0.37	0.04	120.51	1.47	0.15
PM2.5 - Exhaust	29.25	0.34	0.04	110.87	1.35	0.14
HC	29.32	0.34	0.04	208.98	2.55	0.26
NOx	553.40	6.48	0.72	3,859	47.11	4.71
CO	132.81	1.55	0.17	2,518	30.73	3.07
SOx	0.72	0.01	0.00	0.16	0.00	0.00
CO2	-	-	-	402.75	-	-

Project

	K			L		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	28,452.92	178.43	21.41	-	-	-
VMT (%)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
TSP - Dust	1,047.65	6.57	0.79	-	-	-
PM10 - Dust	209.53	1.31	0.16	-	-	-
PM2.5 - Dust	51.43	0.32	0.04	-	-	-
TSP - Exhaust	44.30	0.28	0.03	-	-	-
PM10 - Exhaust	44.30	0.28	0.03	-	-	-
PM2.5 - Exhaust	40.76	0.26	0.03	-	-	-
HC	40.85	0.26	0.03	-	-	-
NOx	771.05	4.84	0.58	-	-	-
CO	185.05	1.16	0.14	-	-	-
SOx	1.01	0.01	0.00	-	-	-
CO2 (tons)	-	-	-	-	-	-

Increment

	K			L		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	8,031.78	-60.57	-5.14	-5,383.71	-65.72	-6.57
TSP - Dust	295.73	-2.23	-0.19	-20,024.68	-244.45	-24.44
PM10 - Dust	59.15	-0.45	-0.04	-5,694.30	-69.51	-6.95
PM2.5 - Dust	14.52	-0.11	-0.01	-569.43	-6.95	-0.70
TSP - Exhaust	12.51	-0.09	-0.01	-120.51	-1.47	-0.15
PM10 - Exhaust	12.51	-0.09	-0.01	-120.51	-1.47	-0.15
PM2.5 - Exhaust	11.51	-0.09	-0.01	-110.87	-1.35	-0.14
HC	11.53	-0.09	-0.01	-208.98	-2.55	-0.26
NOx	217.66	-1.64	-0.14	-3,859.43	-47.11	-4.71
CO	52.24	-0.39	-0.03	-2,517.71	-30.73	-3.07
SOx	0.28	-0.00	-0.00	-0.16	-0.00	-0.00
CO2 (tons)	-	-	-	-402.75	-	-

Baseline

	M			Total On-site		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	-	-	-	133,589.61	1,554.73	174.67
VMT (%)	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
TSP - Dust	-	-	-	496,885.92	5,782.81	649.67
PM10 - Dust	-	-	-	141,296.45	1,644.42	184.74
PM2.5 - Dust	-	-	-	14,129.64	164.44	18.47
TSP - Exhaust	-	-	-	2,990.42	34.80	3.91
PM10 - Exhaust	-	-	-	2,990.42	34.80	3.91
PM2.5 - Exhaust	-	-	-	2,751.18	32.02	3.60
HC	-	-	-	5,185.65	60.35	6.78
NOx	-	-	-	95,766.76	1,114.54	125.21
CO	-	-	-	62,473.56	727.07	81.68
SOx	-	-	-	3.99	0.05	0.01
CO2	-	-	-	9,994		

Project 1.40

	M			Total On-site		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	-	-	-	187,083.73	1,173.35	140.80
VMT (%)	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
TSP - Dust	-	-	-	695,857.06	4,364.25	523.71
PM10 - Dust	-	-	-	197,876.67	1,241.04	148.92
PM2.5 - Dust	-	-	-	19,787.67	124.10	14.89
TSP - Exhaust	-	-	-	4,187.89	26.27	3.15
PM10 - Exhaust	-	-	-	4,187.89	26.27	3.15
PM2.5 - Exhaust	-	-	-	3,852.86	24.16	2.90
HC	-	-	-	7,262.18	45.55	5.47
NOx	-	-	-	134,115.25	841.14	100.94
CO	-	-	-	87,490.24	548.72	65.85
SOx	-	-	-	5.58	0.04	0.00
CO2 (tons)	-	-	-	13,995.68	-	-

Increment

	M			Total On-site		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	-	-	-	53,494.12	-381.39	-33.87
TSP - Dust	-	-	-	198,971.14	-1,418.56	-125.96
PM10 - Dust	-	-	-	56,580.22	-403.39	-35.82
PM2.5 - Dust	-	-	-	5,658.02	-40.34	-3.58
TSP - Exhaust	-	-	-	1,197.47	-8.54	-0.76
PM10 - Exhaust	-	-	-	1,197.47	-8.54	-0.76
PM2.5 - Exhaust	-	-	-	1,101.67	-7.85	-0.70
HC	-	-	-	2,076.52	-14.80	-1.31
NOx	-	-	-	38,348.48	-273.40	-24.28
CO	-	-	-	25,016.68	-178.36	-15.84
SOx	-	-	-	1.60	-0.01	-0.00
CO2 (tons)	-	-	-	4,001.88	-	-

Baseline

	Total Offsite			Total		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	3,787,945.55	3,787,945.55	3,787,945.55	3,921,535.16	3,789,500.28	3,788,120.22
VMT (%)	100.00%	100.00%	100.00%			
TSP - Dust	139,473.29	139,473.29	139,473.29	636,359.21	145,256.10	140,122.96
PM10 - Dust	27,894.66	27,894.66	27,894.66	169,191.10	29,539.08	28,079.40
PM2.5 - Dust	6,846.87	6,846.87	6,846.87	20,976.52	7,011.31	6,865.35
TSP - Exhaust	5,898.06	5,898.06	5,898.06	8,888.47	5,932.86	5,901.97
PM10 - Exhaust	5,898.06	5,898.06	5,898.06	8,888.47	5,932.86	5,901.97
PM2.5 - Exhaust	5,426.21	5,426.21	5,426.21	8,177.40	5,458.23	5,429.81
HC	5,437.75	5,437.75	5,437.75	10,623.40	5,498.10	5,444.53
NOx	102,650.55	102,650.55	102,650.55	198,417.31	103,765.10	102,775.77
CO	24,635.25	24,635.25	24,635.25	87,108.81	25,362.33	24,716.94
SOx	133.92	133.92	133.92	137.90	133.96	133.92
CO2	7,067.22	7,067.22	7,067.22	17,061.02	7,067.22	7,067.22

Project

	Total Offsite			Total		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	3,940,736.00	3,940,736.00	3,940,736.00	4,127,819.73	3,941,909.35	3,940,876.80
VMT (%)	100.00%	100.00%	100.00%			
TSP - Dust	145,099.08	145,099.08	145,099.08	840,956.14	149,463.33	145,622.79
PM10 - Dust	29,019.82	29,019.82	29,019.82	226,896.48	30,260.85	29,168.74
PM2.5 - Dust	7,123.05	7,123.05	7,123.05	26,910.71	7,247.15	7,137.94
TSP - Exhaust	6,135.96	6,135.96	6,135.96	10,323.85	6,162.23	6,139.11
PM10 - Exhaust	6,135.96	6,135.96	6,135.96	10,323.85	6,162.23	6,139.11
PM2.5 - Exhaust	5,645.08	5,645.08	5,645.08	9,497.94	5,669.25	5,647.98
HC	5,657.09	5,657.09	5,657.09	12,919.27	5,702.63	5,662.55
NOx	106,791.06	106,791.06	106,791.06	240,906.31	107,632.20	106,892.00
CO	25,628.94	25,628.94	25,628.94	113,119.18	26,177.66	25,694.79
SOx	139.32	139.32	139.32	144.90	139.35	139.32
CO2 (tons)	7,339.35	7,339.35	7,339.35	21,335.03	7,339.35	7,339.35

Increment

	Total Offsite			Total		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	152,790.45	152,790.45	152,790.45	206,284.57	152,409.06	152,756.58
TSP - Dust	5,625.79	5,625.79	5,625.79	204,596.93	4,207.23	5,499.83
PM10 - Dust	1,125.16	1,125.16	1,125.16	57,705.38	721.77	1,089.34
PM2.5 - Dust	276.18	276.18	276.18	5,934.20	235.84	272.59
TSP - Exhaust	237.90	237.90	237.90	1,435.38	229.37	237.15
PM10 - Exhaust	237.90	237.90	237.90	1,435.38	229.37	237.15
PM2.5 - Exhaust	218.87	218.87	218.87	1,320.55	211.02	218.17
HC	219.34	219.34	219.34	2,295.86	204.53	218.02
NOx	4,140.51	4,140.51	4,140.51	42,488.99	3,867.10	4,116.23
CO	993.69	993.69	993.69	26,010.37	815.33	977.85
SOx	5.40	5.40	5.40	7.00	5.39	5.40
CO2 (tons)	272.13	272.13	272.13	4,274.01	272.13	272.13

	VOL1	VOL2	VOL3	VOL4	VOL5	VOL6	VOL7	VOL8	VOL9	VOL10
TSPann	-3.50E-01	-8.14E-01	0.00E+00	-3.00E-01	-3.00E-01	1.14E-01	4.33E-01	8.23E-03	3.41E-01	1.30E+00
TSPday	-1.28E+00	-2.97E+00	0.00E+00	-1.09E+00	-1.09E+00	4.15E-01	1.58E+00	3.01E-02	1.24E+00	4.73E+00
PM10ann	-1.17E-01	-4.10E-01	0.00E+00	-1.48E-01	-1.48E-01	2.10E-02	2.18E-01	4.30E-03	6.40E-02	6.52E-01
PM10day	-4.29E-01	-1.50E+00	0.00E+00	-5.40E-01	-5.40E-01	7.66E-02	7.97E-01	1.57E-02	2.33E-01	2.38E+00
PM25ann	-4.03E-02	-1.27E-01	0.00E+00	-5.23E-02	-5.23E-02	5.06E-03	5.23E-02	1.71E-03	2.34E-02	1.53E-01
PM25day	-1.47E-01	-4.62E-01	0.00E+00	-1.91E-01	-1.91E-01	1.85E-02	1.91E-01	6.22E-03	8.53E-02	5.60E-01
NOxyr	-1.42E-01	-1.17E-01	0.00E+00	-3.45E-03	-3.45E-03	2.50E-03	7.30E-02	1.28E-02	1.02E-01	1.52E-01
NOxhr	-2.08E+00	-1.71E+00	0.00E+00	-5.03E-02	-5.03E-02	3.66E-02	1.07E+00	1.87E-01	1.49E+00	2.22E+00
TSPann (lb/yr/src)	-24344.179	-56602.499	0	-20836.774	-20836.774	7899.79756	30132.5258	572.507122	23689.7697	90156.0658
TSPday (lb/day/src)	-243.44179	-566.02499	0	-208.36774	-208.36774	78.9979756	301.325258	5.72507122	236.897697	901.560658
PM10ann (lb/yr/src)	-8167.1132	-28507.675	0	-10281.845	-10281.845	1459.43901	15182.9663	298.702889	4446.23095	45307.3873
PM10day (lb/day/src)	-81.671132	-285.07675	0	-102.81845	-102.81845	14.5943901	151.829663	2.98702889	44.4623095	453.073873
PM25ann (lb/yr/src)	-2803.8977	-8798.7133	0	-3636.8902	-3636.8902	351.818377	3634.15286	118.568524	1625.57054	10660.9469
PM25day (lb/day/src)	-28.038977	-87.987133	0	-36.368902	-36.368902	3.51818377	36.3415286	1.18568524	16.2557054	106.609469
NOx (lb/yr/src)	-9898.008	-8146.057	0	-239.58991	-239.58991	174.091745	5075.75189	892.577239	7092.38564	10583.7616
NOx (lb/hr/src)	-16.49668	-13.576762	0	-0.3993165	-0.3993165	0.29015291	8.45958648	1.48762873	11.8206427	17.6396027
TSPann (lb/yr)	-24,344	-56,602	0	-20,837	-20,837	7,900	30,133	573	23,690	90,156
TSPday (lb/day)	-243	-566	0	-208	-208	79	301	6	237	902
PM10ann (lb/yr)	-8,167	-28,508	0	-10,282	-10,282	1,459	15,183	299	4,446	45,307
PM10day (lb/day)	-82	-285	0	-103	-103	15	152	3	44	453
PM25ann (lb/yr)	-2,804	-8,799	0	-3,637	-3,637	352	3,634	119	1,626	10,661
PM25day (lb/day)	-28	-88	0	-36	-36	4	36	1	16	107
HC (lb/yr)	-640	-554	0	-16	-16	23	344	61	330	720
NOx (lb/yr)	-9,898	-8,146	0	-240	-240	174	5,076	893	7,092	10,584
CO (lb/yr)	-14,201	-5,306	0	-156	-156	112	2,822	581	7,437	6,894
SOx (lb/yr)	-0.305	-0.292	0	-0.009	-0.009	0.006	0.164	0.032	0.731	0.379
CO2 (ton/yr)	-584	-769	0	-23	-23	25	433	84	806	999
TSP (lb/yr)	-24,344	-56,602	0	-20,837	-20,837	7,900	30,133	573	23,690	90,156
PM10 (lb/yr)	-8,167	-28,508	0	-10,282	-10,282	1,459	15,183	299	4,446	45,307
PM2.5 (lb/yr)	-2,804	-8,799	0	-3,637	-3,637	352	3,634	119	1,626	10,661

	A	B	C	E0	G	H	I	J	K	L	M
TSPann	8.07E-03	2.02E-02	1.84E-02	2.64E-02	9.53E-03	-8.90E-03	6.54E-04	-1.30E-02	5.54E-05	-1.45E-02	0.00E+00
TSPday	1.57E-02	4.04E-02	3.11E-02	4.48E-02	1.66E-04	-4.01E-02	-3.07E-02	-5.81E-02	-1.53E-04	-6.46E-02	0.00E+00
PM10ann	2.33E-03	5.83E-03	5.30E-03	7.63E-03	2.75E-03	-2.57E-03	1.89E-04	-3.76E-03	1.29E-05	-4.18E-03	0.00E+00
PM10day	4.54E-03	1.17E-02	8.97E-03	1.29E-02	4.79E-05	-1.16E-02	-8.85E-03	-1.68E-02	-3.55E-05	-1.86E-02	0.00E+00
PM25ann	2.73E-04	6.82E-04	6.21E-04	8.93E-04	3.22E-04	-3.01E-04	2.21E-05	-4.40E-04	4.68E-06	-4.89E-04	0.00E+00
PM25day	5.31E-04	1.37E-03	1.05E-03	1.51E-03	5.60E-06	-1.35E-03	-1.04E-03	-1.96E-03	-1.29E-05	-2.18E-03	0.00E+00
NOxyr	1.55E-03	3.87E-03	3.52E-03	5.06E-03	1.83E-03	-1.71E-03	1.25E-04	-2.50E-03	3.91E-05	-2.78E-03	0.00E+00
NOxhr	8.68E-03	2.23E-02	1.71E-02	2.47E-02	9.16E-05	-1.84E-02	-1.41E-02	-2.67E-02	-2.20E-04	-2.97E-02	0.00E+00
TSPann (lb/yr/src)	561.3787	1403.89	1277.61	1837.47	662.758	-618.981	45.4659	-906.29	3.85298	-1007.26	0
TSPday (lb/day/src)	2.995892	7.70169	5.9171	8.54293	0.03161	-7.64125	-5.8384	-11.0633	-0.02906	-12.2959	0
PM10ann (lb/yr/src)	162.0392	405.227	368.775	530.378	191.302	-178.666	13.1235	-261.596	0.89566	-290.741	0
PM10day (lb/day/src)	0.864749	2.22306	1.70794	2.46587	0.00912	-2.20561	-1.68523	-3.19337	-0.00675	-3.54914	0
PM25ann (lb/yr/src)	18.95776	47.4095	43.1448	62.0515	22.3813	-20.903	1.53538	-30.6054	0.32529	-34.0152	0
PM25day (lb/day/src)	0.101171	0.26009	0.19982	0.28849	0.00107	-0.25804	-0.19716	-0.37361	-0.00245	-0.41523	0
NOx (lb/yr/src)	107.5494	268.959	244.765	352.025	126.972	-118.585	8.71039	-173.628	2.72069	-192.972	0
NOx (lb/hr/src)	0.068875	0.17706	0.13603	0.1964	0.00073	-0.14639	-0.11176	-0.21195	-0.00174	-0.23557	0
TSPann (lb/yr)	21,332	23,866	17,886	99,224	216,722	-126,272	182	-32,626	308	-20,145	0
TSPday (lb/day)	114	131	83	461	10	-1,559	-23	-398	-2	-246	0
PM10ann (lb/yr)	6,157	6,889	5,163	28,640	62,556	-36,448	52	-9,417	72	-5,815	0
PM10day (lb/day)	33	38	24	133	3	-450	-7	-115	-1	-71	0
PM25ann (lb/yr)	720	806	604	3,351	7,319	-4,264	6	-1,102	26	-680	0
PM25day (lb/day)	4	4	3	16	0	-53	-1	-13	0	-8	0
HC (lb/yr)	221	248	186	1,029	2,248	-1,310	2	-338	12	-209	0
NOx (lb/yr)	4,087	4,572	3,427	19,009	41,520	-24,191	35	-6,251	218	-3,859	0
CO (lb/yr)	2,666	2,983	2,235	12,401	27,085	-15,781	23	-4,078	52	-2,518	0
SOx (lb/yr)	0.170	0.190	0.143	0.791	1.728	-1.007	0.001	-0.260	0.284	-0.161	0
CO2 (ton/yr)	426	477	358	1,984	4,333	-2,524	4	-652	0	-403	0
TSP (lb/yr)	21,332	23,866	17,886	99,224	216,722	-126,272	182	-32,626	308	-20,145	0
PM10 (lb/yr)	6,157	6,889	5,163	28,640	62,556	-36,448	52	-9,417	72	-5,815	0
PM2.5 (lb/yr)	720	806	604	3,351	7,319	-4,264	6	-1,102	26	-680	0

	Total Sentinel Butterfield	Total White Knob	Total Processing Plant	Total Offsite
TSPann				
TSPday				
PM10ann				
PM10day				
PM25ann				
PM25day				
NOxyr				
NOxhr				
TSPann (lb/yr/src)				
TSPday (lb/day/src)				
PM10ann (lb/yr/src)				
PM10day (lb/day/src)				
PM25ann (lb/yr/src)				
PM25day (lb/day/src)				
NOx (lb/yr/src)				
NOx (lb/hr/src)				
TSPann (lb/yr)	523,581	-301,664	8,082	
TSPday (lb/day)	2,245	-3,429	56	
PM10ann (lb/yr)	174,641	-108,919	1,512	
PM10day (lb/day)	883	-1,208	8	
PM25ann (lb/yr)	28,839	-24,923	358	
PM25day (lb/day)	187	-263	3	
HC (lb/yr)	5,387	-3,085	25	219.3
NOx (lb/yr)	96,259	-52,825	209	4140.5
CO (lb/yr)	65,105	-42,195	134	993.7
SOx (lb/yr)	4	-2	0	5.4
CO2 (ton/yr)	9,900	-4,978	28	272.1
TSP (lb/yr)	523,581	-301,664	8,082	5863.7
PM10 (lb/yr)	174,641	-108,919	1,512	1363.1
PM2.5 (lb/yr)	28,839	-24,923	358	495.0

	Total Project w/o White Kno	Total Project w/ White Knob
TSPann		
TSPday		
PM10ann		
PM10day		
PM25ann		
PM25day		
NOxyr		
NOxhr		
TSPann (lb/yr/src)		
TSPday (lb/day/src)		
PM10ann (lb/yr/src)		
PM10day (lb/day/src)		
PM25ann (lb/yr/src)		
PM25day (lb/day/src)		
NOx (lb/yr/src)		
NOx (lb/hr/src)		
TSPann (lb/yr)	531,663	229,999
TSPday (lb/day)	2,300	-1,129
PM10ann (lb/yr)	176,153	67,234
PM10day (lb/day)	891	-317
PM25ann (lb/yr)	29,197	4,274
PM25day (lb/day)	190	-73
HC (lb/yr)	5,631	2,547
NOx (lb/yr)	100,609	47,784
CO (lb/yr)	66,233	24,037
SOx (lb/yr)	10	8
CO2 (ton/yr)	10,201	5,223
TSP (lb/yr)	537,527	235,863
PM10 (lb/yr)	177,516	68,597
PM2.5 (lb/yr)	29,692	4,769

Volume Source Identifiers

```
 LOCATION VOL1    VOLUME   498771.228  3802380.117    0.
** DESCRSRC White Knob Crushing
 LOCATION VOL2    VOLUME   498410.694  3802532.330    0.
** DESCRSRC White Knob Pit
 LOCATION VOL3    VOLUME   499367.635  3802416.274    0.
** DESCRSRC White Ridge Pit

 LOCATION VOL4    VOLUME   499169.967  3802653.553    0.
** DESCRSRC OB1
 LOCATION VOL5    VOLUME   498786.819  3802108.559    0.
** DESCRSRC OB2
 LOCATION VOL6    VOLUME   505294.247  3804607.151    0.
** DESCRSRC Processing Plant
 LOCATION VOL7    VOLUME   504322.000  3798695.000    0.
** DESCRSRC Butterfield Pit
 LOCATION VOL8    VOLUME   505430.000  3797960.000    0.
** DESCRSRC B5 Pad Expansion
 LOCATION VOL9    VOLUME   505555.000  3798545.000    0.
** DESCRSRC Butterfield-Sentinel Crushing
 LOCATION VOL10    VOLUME   505808.000  3798770.000    0
** DESCRSRC Sentinel Pit
```

	ID	# of sources	ID	# of sources	ID	# of sources	ID	# of sources
	A	38	B	17	C	14	E0	54
CHEMICAL	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)
arsenic	0.00238	8.24097E-06	0.005952	3.92963E-06	0.005417	3.01908E-06	0.007791	4.35885E-06
bromine	0.002856	1.52625E-05	0.007143	4.7244E-06	0.0065	3.62969E-06	0.009349	5.24043E-06
cadmium	0.002063	0.000102071	0.005159	3.56196E-06	0.004695	2.7366E-06	0.006752	3.95102E-06
chlorine	0.133927	0.000189875	0.334923	0.000220656	0.304795	0.000169527	0.438361	0.000244758
copper	0.025072	0.000224273	0.062699	4.16184E-05	0.057059	3.19748E-05	0.082063	4.61642E-05
lead	0.020629	4.67939E-05	0.051588	3.40162E-05	0.046947	2.61342E-05	0.06752	3.77317E-05
manganese	0.145193	0.000287765	0.363098	0.000239353	0.330436	0.000183892	0.475238	0.000265497
mercury	0.002222	2.49311E-05	0.005556	3.69603E-06	0.005056	2.83961E-06	0.007271	4.09974E-06
nickel	0.005871	3.3985E-05	0.014683	9.71556E-06	0.013362	7.46433E-06	0.019217	1.07768E-05
selenium	0.000476	2.71716E-05	0.00119	8.27944E-07	0.001083	6.36098E-07	0.001558	9.18378E-07
vanadium (fume or dust)	0.012218	1.1183E-05	0.030556	2.01208E-05	0.027807	1.54586E-05	0.039993	2.23186E-05
Silica, Crystln	6.347235	0.00406477	15.87315	0.010449513	14.44527	0.008028214	20.77542	0.011590883
Asbestos	0	0	0	0	0	0	0	0
1,3-butadiene	0	7.08601E-06	0	1.82164E-05	0	1.39954E-05	0	2.02061E-05
acetaldehyde	0	0.000274117	0	0.000704686	0	0.0005414	0	0.000781657
benzene	0	7.45896E-05	0	0.000191751	0	0.00014732	0	0.000212696
ethyl benzene	0	1.15614E-05	0	2.97215E-05	0	2.28346E-05	0	3.29678E-05
formaldehyde	0	0.000548606	0	0.001410331	0	0.001083537	0	0.001564377
hexane	0	5.96717E-06	0	1.53401E-05	0	1.17856E-05	0	1.70157E-05
methanol	0	1.11884E-06	0	2.87627E-06	0	2.2098E-06	0	3.19044E-06
methyl ethyl ketone {2-butanone	0	5.51963E-05	0	0.000141896	0	0.000109017	0	0.000157395
m-xylene	0	2.27498E-05	0	5.84841E-05	0	4.49325E-05	0	6.48722E-05
naphthalene	0	3.35653E-06	0	8.62881E-06	0	6.62939E-06	0	9.57131E-06
o-xylene	0	1.26802E-05	0	3.25977E-05	0	2.50444E-05	0	3.61583E-05
propylene	0	9.69665E-05	0	0.000249277	0	0.000191516	0	0.000276504
p-xylene	0	3.72948E-06	0	9.58756E-06	0	7.36599E-06	0	1.06348E-05
styrene	0	2.23769E-06	0	5.75254E-06	0	4.41959E-06	0	6.38087E-06
toluene	0	5.48234E-05	0	0.000140937	0	0.00010828	0	0.000156331
DieselExhPM	3.358343	0	8.398536	0	7.64304	0	10.99234	0

	ID	# of sources	ID	# of sources	ID	# of sources	ID	# of sources
	G	327	H	204	I	4	J	36
CHEMICAL	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)
arsenic	0.002810055	1.61271E-08	-0.00262	-3.24899E-06	0.000193	-2.48032E-06	-0.00384	-4.70401E-06
bromine	0.003372066	1.93888E-08	-0.00315	-3.9061E-06	0.000231	-2.98197E-06	-0.00461	-5.6554E-06
cadmium	0.002435381	1.46182E-08	-0.00227	-2.945E-06	0.000167	-2.24826E-06	-0.00333	-4.26389E-06
chlorine	0.158112409	9.05569E-07	-0.14767	-0.000182437	0.010847	-0.000139275	-0.21621	-0.000264139
copper	0.029599242	1.70801E-07	-0.02764	-3.44098E-05	0.002031	-2.62689E-05	-0.04048	-4.98198E-05
lead	0.024353807	1.39602E-07	-0.02275	-2.81244E-05	0.001671	-2.14706E-05	-0.0333	-4.07196E-05
manganese	0.171413334	9.82301E-07	-0.16009	-0.000197896	0.011759	-0.000151076	-0.2344	-0.000286521
mercury	0.002622718	1.51684E-08	-0.00245	-3.05585E-06	0.00018	-2.33288E-06	-0.00359	-4.42438E-06
nickel	0.006931468	3.98725E-08	-0.00647	-8.03276E-06	0.000476	-6.13233E-06	-0.00948	-1.16301E-05
selenium	0.000562011	3.39787E-09	-0.00052	-6.84539E-07	3.86E-05	-5.22587E-07	-0.00077	-9.91102E-07
vanadium (fume or dust)	0.014424947	8.25755E-08	-0.01347	-1.66358E-05	0.00099	-1.27E-05	-0.01973	-2.40859E-05
Silica, Crystln	7.493479098	4.28846E-05	-6.99851	-0.008639586	0.51406	-0.006595587	-10.247	-0.012508731
Asbestos	0	0	0	0	0	0	0	0
1,3-butadiene	0	7.47596E-08	0	-1.50612E-05	0	-1.14979E-05	0	-2.18062E-05
acetaldehyde	0	2.89202E-06	0	-0.00058263	0	-0.000444788	0	-0.000843554
benzene	0	7.86944E-07	0	-0.000158539	0	-0.000121031	0	-0.000229538
ethyl benzene	0	1.21976E-07	0	-2.45735E-05	0	-1.87598E-05	0	-3.55785E-05
formaldehyde	0	5.78797E-06	0	-0.001166052	0	-0.000890181	0	-0.001688256
hexane	0	6.29555E-08	0	-1.26831E-05	0	-9.68246E-06	0	-1.83631E-05
methanol	0	1.18042E-08	0	-2.37808E-06	0	-1.81546E-06	0	-3.44308E-06
methyl ethyl ketone {2-butanone	0	5.82338E-07	0	-0.000117319	0	-8.95628E-05	0	-0.000169858
m-xylene	0	2.40018E-07	0	-4.83543E-05	0	-3.69144E-05	0	-7.00092E-05
naphthalene	0	3.54125E-08	0	-7.13424E-06	0	-5.44638E-06	0	-1.03292E-05
o-xylene	0	1.3378E-07	0	-2.69516E-05	0	-2.05752E-05	0	-3.90215E-05
propylene	0	1.02303E-06	0	-0.0002061	0	-0.00015734	0	-0.0002984
p-xylene	0	3.93472E-08	0	-7.92693E-06	0	-6.05154E-06	0	-1.14769E-05
styrene	0	2.36083E-08	0	-4.75616E-06	0	-3.63092E-06	0	-6.88615E-06
toluene	0	5.78404E-07	0	-0.000116526	0	-8.89576E-05	0	-0.000168711
DieselExhPM	3.964824266	0	-3.70294	0	0.271991	0	-5.42171	0

	ID	# of sources	ID	# of sources	ID	# of sources	ID	# of sources	ID	# of sources
	K	80	L	20	M	12	VOL1	1	VOL2	1
CHEMICAL	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)
arsenic	3.92867E-05	-7.30302E-09	-0.00427	-5.22808E-06	0	0	-0.6271584	-0.001046	-2.251914	-0.003754
bromine	4.7144E-05	-8.92382E-09	-0.00512	-6.28547E-06	0	0	-0.391974	-0.000655	-1.407446	-0.002348
cadmium	3.40485E-05	-9.15937E-09	-0.0037	-4.73893E-06	0	0	-0.6271584	-0.001062	-2.251914	-0.003771
chlorine	0.002210531	-4.02753E-07	-0.2403	-0.000293567	0	0	-140.091507	-0.233503	-503.0212	-0.838387
copper	0.00041382	-8.10234E-08	-0.04498	-5.53702E-05	0	0	-5.56603079	-0.009311	-19.98573	-0.033347
lead	0.000340485	-6.25586E-08	-0.03701	-4.52561E-05	0	0	-13.5623004	-0.022609	-48.69763	-0.081169
manganese	0.002396488	-4.39077E-07	-0.26051	-0.000318442	0	0	-5.09566199	-0.008524	-18.2968	-0.030529
mercury	3.66676E-05	-7.33011E-09	-0.00399	-4.9173E-06	0	0	-0.0783948	-0.000134	-0.281489	-0.000473
nickel	9.69072E-05	-1.84213E-08	-0.01053	-1.29258E-05	0	0	-2.2734492	-0.003794	-8.163187	-0.013611
selenium	7.85734E-06	-2.22152E-09	-0.00085	-1.10152E-06	0	0	-4.39010879	-0.007321	-15.76339	-0.026277
vanadium (fume or dust)	0.000201672	-3.65611E-08	-0.02192	-2.67693E-05	0	0	-0.1567896	-0.000262	-0.562978	-0.000939
Silica, Crystln	0.104764511	-1.89407E-05	-11.3886	-0.013902321	0	0	-313.5792	-0.522632	-1125.957	-1.876595
Asbestos	0	0	0	0	0	0	0	0	0	0
1,3-butadiene	0	-2.06513E-06	0	-2.42356E-05	0	0	0	-0.002027	0	-0.001755
acetaldehyde	0	-7.9888E-05	0	-0.000937534	0	0	0	-0.078431	0	-0.067908
benzene	0	-2.17382E-05	0	-0.000255111	0	0	0	-0.021342	0	-0.018478
ethyl benzene	0	-3.36943E-06	0	-3.95422E-05	0	0	0	-0.003308	0	-0.002864
formaldehyde	0	-0.000159885	0	-0.001876343	0	0	0	-0.156968	0	-0.135909
hexane	0	-1.73906E-06	0	-2.04089E-05	0	0	0	-0.001707	0	-0.001478
methanol	0	-3.26074E-07	0	-3.82667E-06	0	0	0	-0.00032	0	-0.000277
methyl ethyl ketone {2-butanone	0	-1.60863E-05	0	-0.000188782	0	0	0	-0.015793	0	-0.013674
m-xylene	0	-6.63016E-06	0	-7.78089E-05	0	0	0	-0.006509	0	-0.005636
naphthalene	0	-9.78221E-07	0	-1.148E-05	0	0	0	-0.00096	0	-0.000832
o-xylene	0	-3.6955E-06	0	-4.33689E-05	0	0	0	-0.003628	0	-0.003141
propylene	0	-2.82597E-05	0	-0.000331645	0	0	0	-0.027744	0	-0.024022
p-xylene	0	-1.08691E-06	0	-1.27556E-05	0	0	0	-0.001067	0	-0.000924
styrene	0	-6.52147E-07	0	-7.65334E-06	0	0	0	-0.00064	0	-0.000554
toluene	0	-1.59776E-05	0	-0.000187507	0	0	0	-0.015686	0	-0.013582
DieselExhPM	0.156324494	0	-6.02574	0	0	0	-327.633166	0	-358.7551	0

	ID	# of sources	ID	# of sources	ID	# of sources	ID	# of sources
	VOL3	1	VOL4	1	VOL5	1	VOL6	1
CHEMICAL	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)
arsenic	0	0	-0.821704	-0.001369541	-0.821704	-0.001369541	0.115476	0.000192513
bromine	0	0	-0.513565	-0.000856011	-0.513565	-0.000856011	0.072172	0.000120394
cadmium	0	0	-0.821704	-0.001370033	-0.821704	-0.001370033	0.115476	0.000193259
chlorine	0	0	-183.548	-0.305913912	-183.548	-0.305913912	25.7944	0.042991501
copper	0	0	-7.292619	-0.012155455	-7.292619	-0.012155455	1.024848	0.001709732
lead	0	0	-17.76934	-0.02961574	-17.76934	-0.02961574	2.497164	0.004162207
manganese	0	0	-6.676341	-0.011128255	-6.676341	-0.011128255	0.938241	0.001565281
mercury	0	0	-0.102713	-0.000171311	-0.102713	-0.000171311	0.014434	2.4244E-05
nickel	0	0	-2.978675	-0.004964617	-2.978675	-0.004964617	0.4186	0.000697906
selenium	0	0	-5.751925	-0.009586682	-5.751925	-0.009586682	0.808331	0.001347431
vanadium (fume or dust)	0	0	-0.205426	-0.000342394	-0.205426	-0.000342394	0.028869	4.81416E-05
Silica, Crystln	0	0	-410.8518	-0.68475292	-410.8518	-0.68475292	57.7379	0.096229826
Asbestos	0	0	0	0	0	0	0	0
1,3-butadiene	0	0	0	-5.1631E-05	0	-5.1631E-05	0	7.38573E-05
acetaldehyde	0	0	0	-0.001997304	0	-0.001997304	0	0.002857111
benzene	0	0	0	-0.000543484	0	-0.000543484	0	0.000777445
ethyl benzene	0	0	0	-8.424E-05	0	-8.424E-05	0	0.000120504
formaldehyde	0	0	0	-0.003997326	0	-0.003997326	0	0.00571811
hexane	0	0	0	-4.34787E-05	0	-4.34787E-05	0	6.21956E-05
methanol	0	0	0	-8.15226E-06	0	-8.15226E-06	0	1.16617E-05
methyl ethyl ketone {2-butanone	0	0	0	-0.000402178	0	-0.000402178	0	0.00057531
m-xylene	0	0	0	-0.000165763	0	-0.000165763	0	0.000237121
naphthalene	0	0	0	-2.44568E-05	0	-2.44568E-05	0	3.4985E-05
o-xylene	0	0	0	-9.23923E-05	0	-9.23923E-05	0	0.000132166
propylene	0	0	0	-0.000706529	0	-0.000706529	0	0.001010679
p-xylene	0	0	0	-2.71742E-05	0	-2.71742E-05	0	3.88723E-05
styrene	0	0	0	-1.63045E-05	0	-1.63045E-05	0	2.33234E-05
toluene	0	0	0	-0.000399461	0	-0.000399461	0	0.000571422
DieselExhPM	0	0	-10.55162	0	-10.55162	0	15.99162	0

	ID	# of sources	ID	# of sources	ID	# of sources	ID	# of sources
	VOL7	1	VOL8	1	VOL9	1	VOL10	1
CHEMICAL	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)
arsenic	1.195767	0.001993732	0.020751	3.47168E-05	0.334935	0.00055909	3.587302	0.00598039
bromine	0.747355	0.001247163	0.01297	2.18782E-05	0.209334	0.000350621	2.242064	0.00373988
cadmium	1.195767	0.002004739	0.020751	3.65513E-05	0.334935	0.000571202	3.587302	0.006002142
chlorine	267.1045	0.445186399	4.635362	0.007727634	74.81613	0.124706966	801.3136	1.335546719
copper	10.61244	0.017711765	0.184169	0.000311011	2.972549	0.004981068	31.83731	0.05311034
lead	25.85847	0.043101379	0.448751	0.000748573	7.242972	0.012075946	77.57541	0.129300111
manganese	9.71561	0.016215484	0.168606	0.00028481	2.721348	0.004560669	29.14683	0.048623105
mercury	0.149471	0.00025187	0.002594	4.78183E-06	0.041867	7.28061E-05	0.448413	0.000752793
nickel	4.334657	0.007227966	0.075224	0.000125963	1.21414	0.00202746	13.00397	0.021680275
selenium	8.370371	0.013953764	0.14526	0.000242625	2.344546	0.003911037	25.11111	0.041858071
vanadium (fume or dust)	0.298942	0.00049863	0.005188	8.71197E-06	0.083734	0.000139989	0.896825	0.001495486
Silica, Crystln	597.8837	0.996472775	10.37574	0.017292899	167.4676	0.279112605	1793.651	2.989418326
Asbestos	0	0	0	0	0	0	0	0
1,3-butadiene	0	0.00108807	0	0.000192348	0	0.001044915	0	0.002280773
acetaldehyde	0	0.042091125	0	0.007440831	0	0.040421699	0	0.088229884
benzene	0	0.011453367	0	0.002024716	0	0.010999102	0	0.024008132
ethyl benzene	0	0.001775272	0	0.000313831	0	0.001704861	0	0.00372126
formaldehyde	0	0.084239517	0	0.014891786	0	0.080898394	0	0.176579808
hexane	0	0.000916269	0	0.000161977	0	0.000879928	0	0.001920651
methanol	0	0.000171801	0	3.03707E-05	0	0.000164987	0	0.000360122
methyl ethyl ketone {2-butanone	0	0.008475492	0	0.00149829	0	0.008139335	0	0.017766017
m-xylene	0	0.003493277	0	0.000617538	0	0.003354726	0	0.00732248
naphthalene	0	0.000515402	0	9.11122E-05	0	0.00049496	0	0.001080366
o-xylene	0	0.001947072	0	0.000344202	0	0.001869847	0	0.004081382
propylene	0	0.014889378	0	0.002632131	0	0.014298832	0	0.031210571
p-xylene	0	0.000572668	0	0.000101236	0	0.000549955	0	0.001200407
styrene	0	0.000343601	0	6.07415E-05	0	0.000329973	0	0.000720244
toluene	0	0.008418225	0	0.001488166	0	0.00808434	0	0.017645977
DieselExhPM	235.8747	0	39.3094	0	259.5419	0	466.1125	0

Appendix J: Meteorological Data Used in Modeling

Table J-1. Wind Speed Class Distribution of Hours in MM5 Meteorological Dataset (2008 to 2012)

Sector	Wind Direction (degrees)	Number of Hours Less Than 0.97 knots (Calms)	Number of Hours Between 0.97 - 4.08 knots	Number of Hours Between 4.08 - 7.00 knots	Number of Hours Between 7.00 - 11.08 knots	Number of Hours Between 11.08 - 17.11 knots	Number of Hours Between 17.11 - 21.58 knots	Number of Hours Greater Than 21.58 knots	Number of Hours at Any Speed
0	Calms	150	0	0	0	0	0	0	150
1	348.75 - 11.25	0	334	273	180	38	3	0	828
2	11.25 - 33.75	0	225	361	357	90	12	0	1045
3	33.75 - 56.25	0	226	385	706	257	50	8	1632
4	56.25 - 78.75	0	156	364	659	520	59	6	1764
5	78.75 - 101.25	0	159	351	776	481	54	0	1821
6	101.25 - 123.75	0	196	646	2087	676	0	0	3605
7	123.75 - 146.25	0	266	562	1178	387	0	0	2393
8	146.25 - 168.75	0	304	364	467	145	0	0	1280
9	168.75 - 191.25	0	302	630	857	498	2	4	2293
10	191.25 - 213.75	0	276	826	3156	5432	375	182	10247
11	213.75 - 236.25	0	209	666	2423	3034	776	303	7411
12	236.25 - 258.75	0	223	763	1724	939	155	26	3830
13	258.75 - 281.25	0	282	769	736	427	43	4	2261
14	281.25 - 303.75	0	295	448	404	350	107	5	1609
15	303.75 - 326.25	0	349	301	235	75	12	0	972
16	326.25 - 348.75	0	352	214	122	13	5	1	707
Total		**150**	**4154**	**7923**	**16067**	**13362**	**1653**	**539**	**43848**

Notes:
Wind direction is referenced to north and increases in the clockwise direction.
Calms are hours with wind speed less than one knot. Plume behaviour during calm hours is modeled by a seperate meandering algorithm in AERMOD.

Table J-2. Wind Speed Class Distribution of MM5 Meteorological Dataset (2008 to 2012)

Sector	Wind Direction (degrees)	Fraction of Hours Less Than 0.97 knots (Calms)	Fraction of Hours Between 0.97 - 4.08 knots	Fraction of Hours Between 4.08 - 7.00 knots	Fraction of Hours Between 7.00 - 11.08 knots	Fraction of Hours Between 11.08 - 17.11 knots	Fraction of Hours Between 17.11 - 21.58 knots	Fraction of Hours Greater Than 21.58 knots	Fraction of Hours at Any Speed
0	Calms	0.00342	0	0	0	0	0	0	0.00342
1	348.75 - 11.25	0	0.00762	0.00623	0.00411	0.00087	0.00007	0	0.0189
2	11.25 - 33.75	0	0.00513	0.00823	0.00814	0.00205	0.00027	0	0.02382
3	33.75 - 56.25	0	0.00515	0.00878	0.0161	0.00586	0.00114	0.00018	0.03721
4	56.25 - 78.75	0	0.00356	0.0083	0.01503	0.01186	0.00135	0.00014	0.04024
5	78.75 - 101.25	0	0.00363	0.008	0.0177	0.01097	0.00123	0	0.04153
6	101.25 - 123.75	0	0.00447	0.01473	0.0476	0.01542	0	0	0.08222
7	123.75 - 146.25	0	0.00607	0.01282	0.02687	0.00883	0	0	0.05459
8	146.25 - 168.75	0	0.00693	0.0083	0.01065	0.00331	0	0	0.02919
9	168.75 - 191.25	0	0.00689	0.01437	0.01954	0.01136	0.00005	0.00009	0.0523
10	191.25 - 213.75	0	0.00629	0.01884	0.07198	0.12388	0.00855	0.00415	0.23369
11	213.75 - 236.25	0	0.00477	0.01519	0.05526	0.06919	0.0177	0.00691	0.16902
12	236.25 - 258.75	0	0.00509	0.0174	0.03932	0.02141	0.00353	0.00059	0.08734
13	258.75 - 281.25	0	0.00643	0.01754	0.01679	0.00974	0.00098	0.00009	0.05157
14	281.25 - 303.75	0	0.00673	0.01022	0.00921	0.00798	0.00244	0.00011	0.03669
15	303.75 - 326.25	0	0.00796	0.00686	0.00536	0.00171	0.00027	0	0.02216
16	326.25 - 348.75	0	0.00803	0.00488	0.00278	0.0003	0.00011	0.00002	0.01612
Subtotal		**0.00342**	**0.09475**	**0.18069**	**0.36644**	**0.30474**	**0.03769**	**0.01228**	**1**

Notes:
Wind direction is referenced to north and increases in the clockwise direction.
Calms are hours with wind speed less than one knot. Plume behaviour during calm hours is modeled by a seperate meandering algorithm in AERMOD.

Surface & Upper Air Met Data
AERMET/AERMOD
Preprocessed from MM5 Data

May 30, 2013

Met Data Order Information:

Order #:	MET133753
Ordered by:	Scott Cohen
Company:	Sespe Consulting, Inc.
Met Data Type:	AERMET-Ready (Surface & Upper Air Data)
Start-End Date:	Jan 01, 2008 - Dec 31, 2012
Latitude:	34.351308 N
Longitude:	116.973803 W
Datum:	WGS 84
Site Time Zone:	UTC/GMT UTC - 8 hour(s)
Closest City & Country:	Lucerne Valley - USA

Calculated Pseudo Met Station Parameters:

Anemometer Height:	13 m
Station Base Elevation:	1543 m
Upper Air Adjustment:	+8 hour(s)

MM5-Processed Grid Cell

- Grid cell centre (Lat, Lon): 34.351308 N, 116.973803 W
- Grid cell dimension: 12 km x 12 km
- Output period: Jan 01, 2008 to Dec 31, 2012
- For more information on MM5 Mesoscale Model, see link below:

  http://www.mmm.ucar.edu/mm5/mm5-home.html

Hourly Surface Met Data (*.sam)

- Format: SAMSON (surface met data for preprocessing by AERMET)
- Anemometer height: 13 meters
- Base elevation above MSL = 1543 meters
- Time Zone: UTC/GMT UTC - 8 hour(s) (data reported in local time)
- Output interval: hourly
- File format description: http://www.webmet.com/MetGuide/Samson.html

Column	Parameter	Unit
6	Total cloud cover	tenths
7	Opaque cloud cover	tenths
8	Dry bulb temperature	degrees Celsius (°C)
9	Dew point temperature	degrees Celsius (°C)
10	Relative humidity	Percentage (%)
11	Station pressure	millibars (mb)
12	Wind direction	degrees (deg)
13	Wind speed	meters/second (m/s)
15	Ceiling height	meters (m) 77777 = unlimited ceiling height
21	Hourly precipitation amount	hundredths of inches

Note:

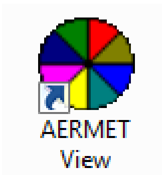
Although not necessary, if the surface file (*.SAM) is opened in a text editor (e.g., Windows NotePad), it may become apparent the file contains numerous 99999 entries in several columns. This is expected as the SAMSON format contains numerous columns which corresponds to parameters that are not used by the current version of the US EPA AERMET model. This does not affect the met data quality and is an artifact generated during MM5 processing to ensure the file is in the correct format for use in AERMET. Rest assured the data needed to support modeling in AERMET is included and not affected by the presence of columns with 99999 data flags.

Upper Air Data (*.ua)

- Format: TD-6201 – Fixed Length (upper air met data for preprocessing by AERMET)
- Data reported in Universal Time Coordinate (UTC) / GMT
- Output interval: 00Z and 12Z
- File format description: http://www.webmet.com/MetGuide/TD6200.html

AERMET View Instructions

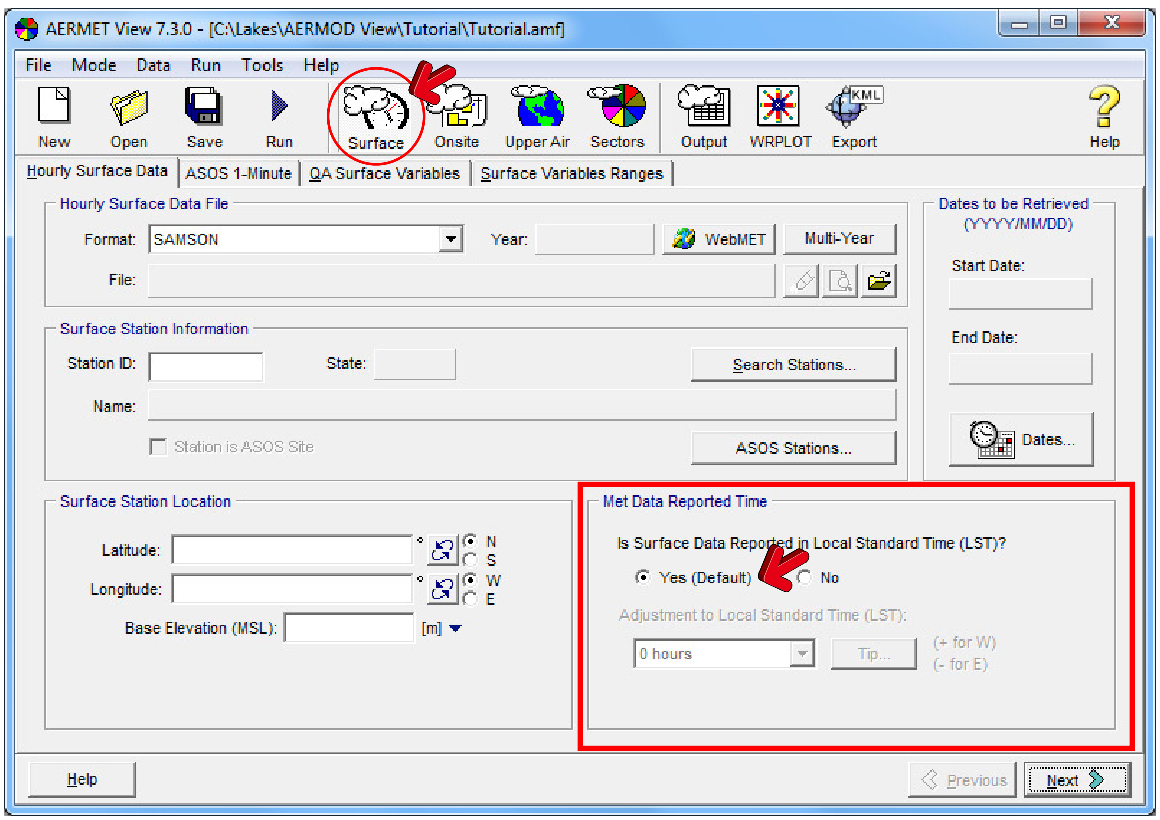
See below some tips on processing your surface (*.sam) and upper air (*.ua) met data files using **AERMET View**.



[Hourly Surface Met Data]

Since the surface data in SAMSON format (*.sam) is provided in local time, you must specify in AERMET View that the surface data does not need to be adjusted to local time by specifying the following:

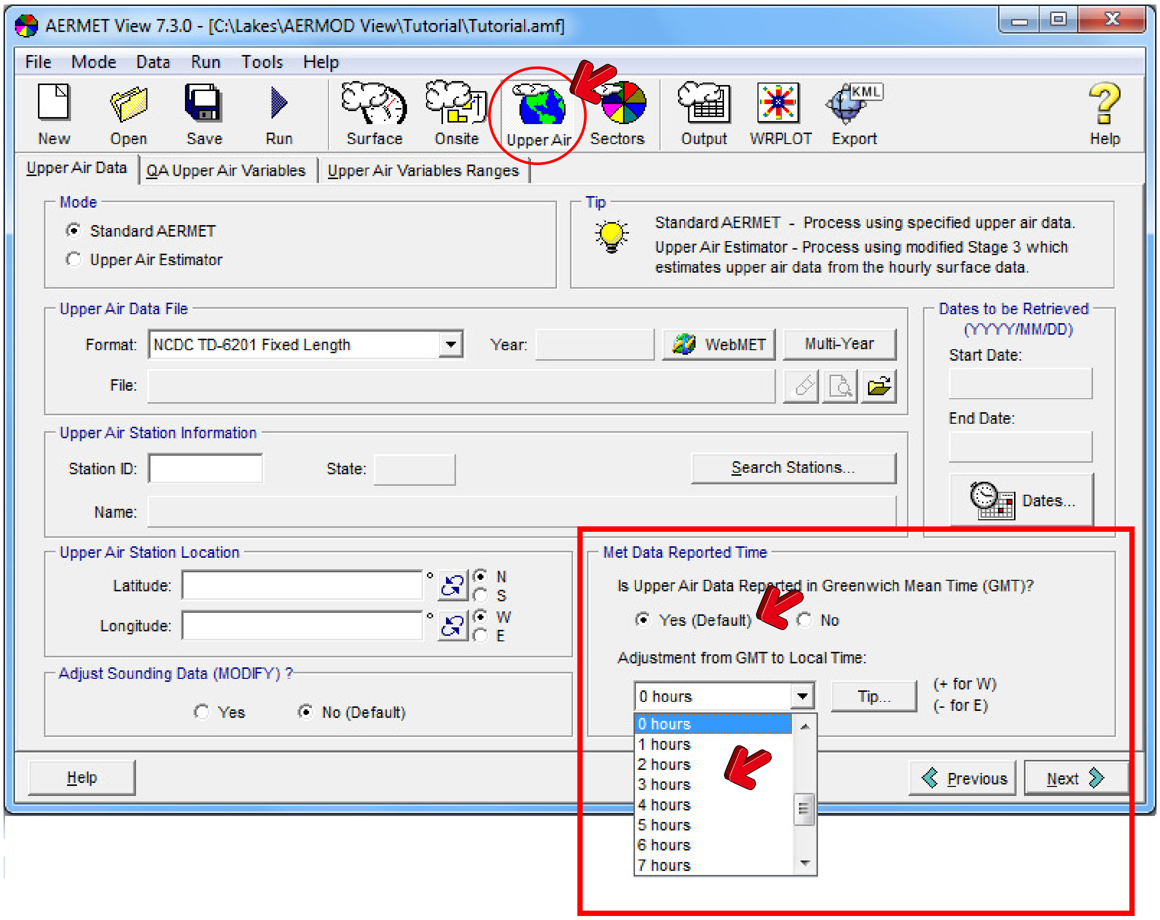
Is Surface Data Reported in Local Standard Time (LST)? Yes (Default)
Adjustment to Local Standard Time (LST): 0 hours



Upper Air Met Data

Since the Upper Air data (*.ua) is provided in UTC/GMT time then you must specify in AERMET View that the data must be adjusted to local time by specifying the following:

Format: NCDC TD-6201 – Fixed Length
Is Upper Air Reported in Greenwich Mean Time (GMT)? Yes
Adjustment from GMT to Local Time: +8 hour(s)

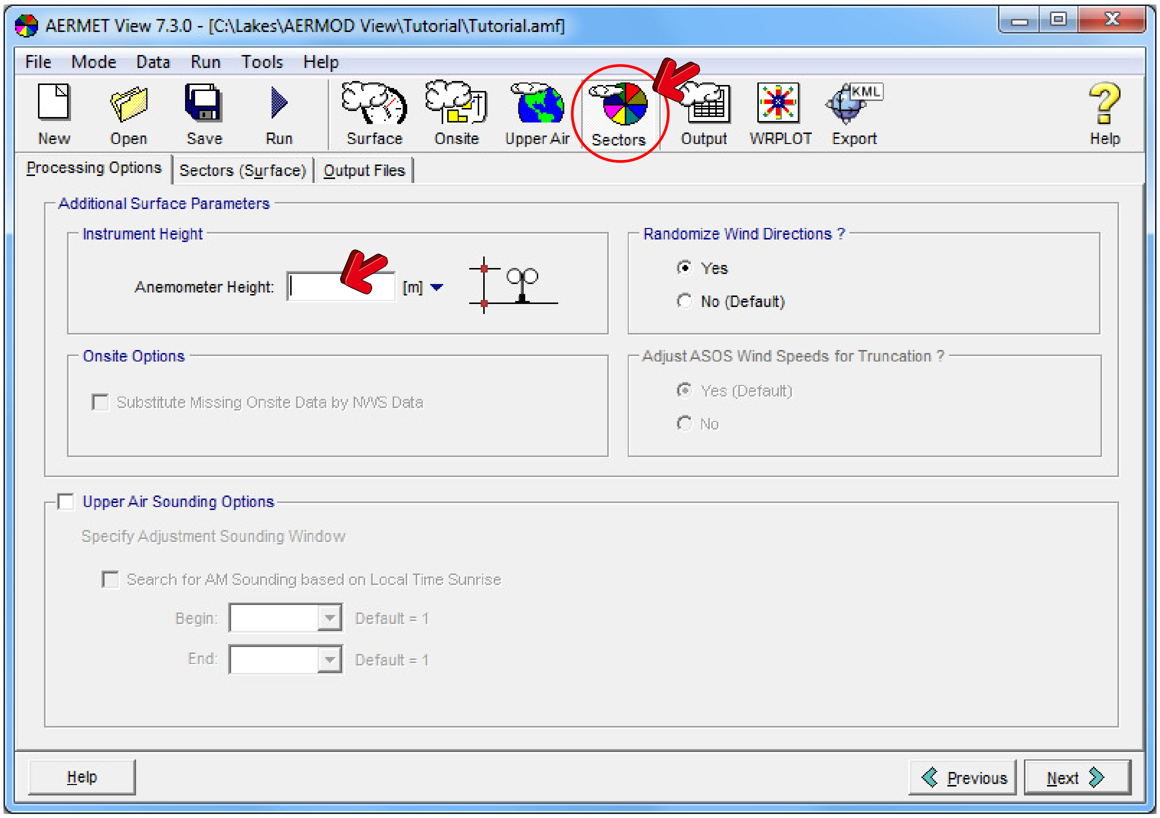


Lakes Environmental Software
E-mail: sales@webLakes.com
Web: www.webLakes.com

Application Site Parameters

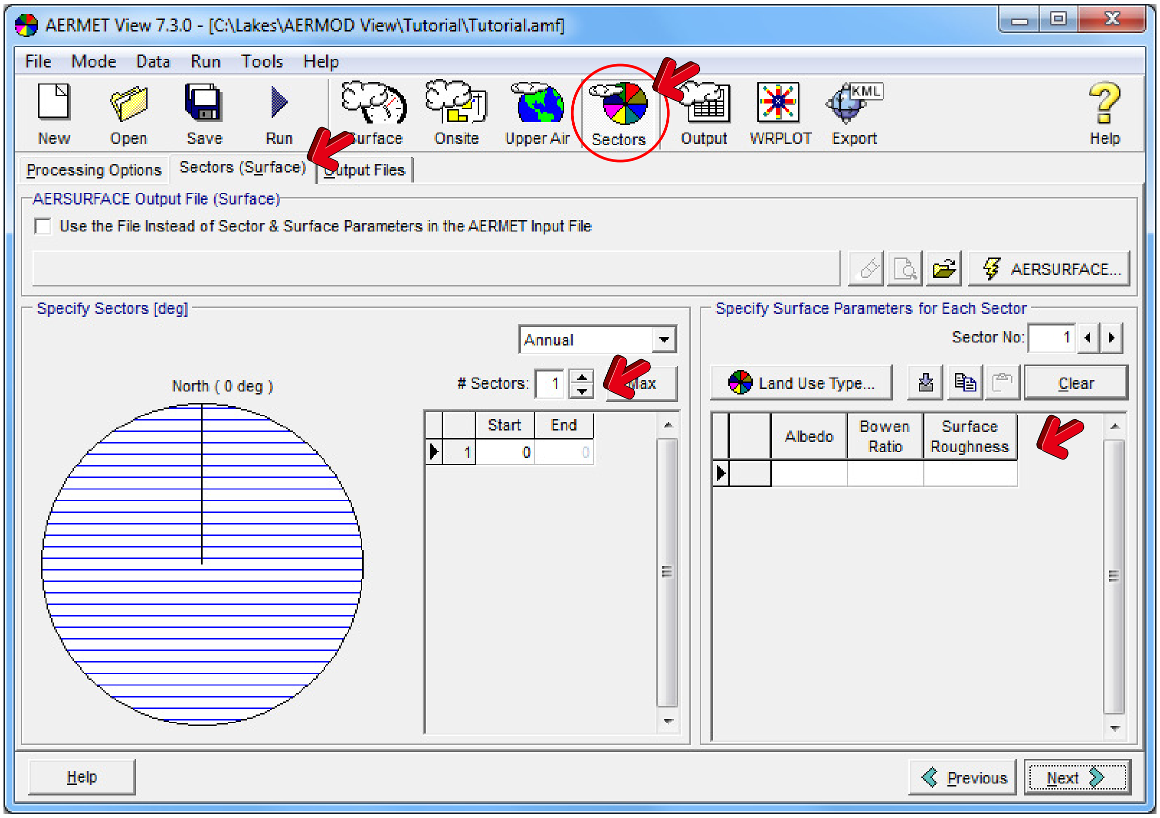
In **AERMET View**, press the **Sectors** menu toolbar button and then under the **Processing Options** tab, specify the following parameter:

Anemometer Height = 13 [m]



Sectors & Surface Parameters

Under the **Sectors (Surface)** tab, specify the number of sectors and the corresponding surface parameters around the facility you are modeling for.



Lakes Environmental
Lakes Environmental Software
E-mail: sales@webLakes.com
Web: www.webLakes.com

AERMOD View Instructions

Start your **AERMOD View** project and go to the **Meteorology Pathway – Met Input Data** window.

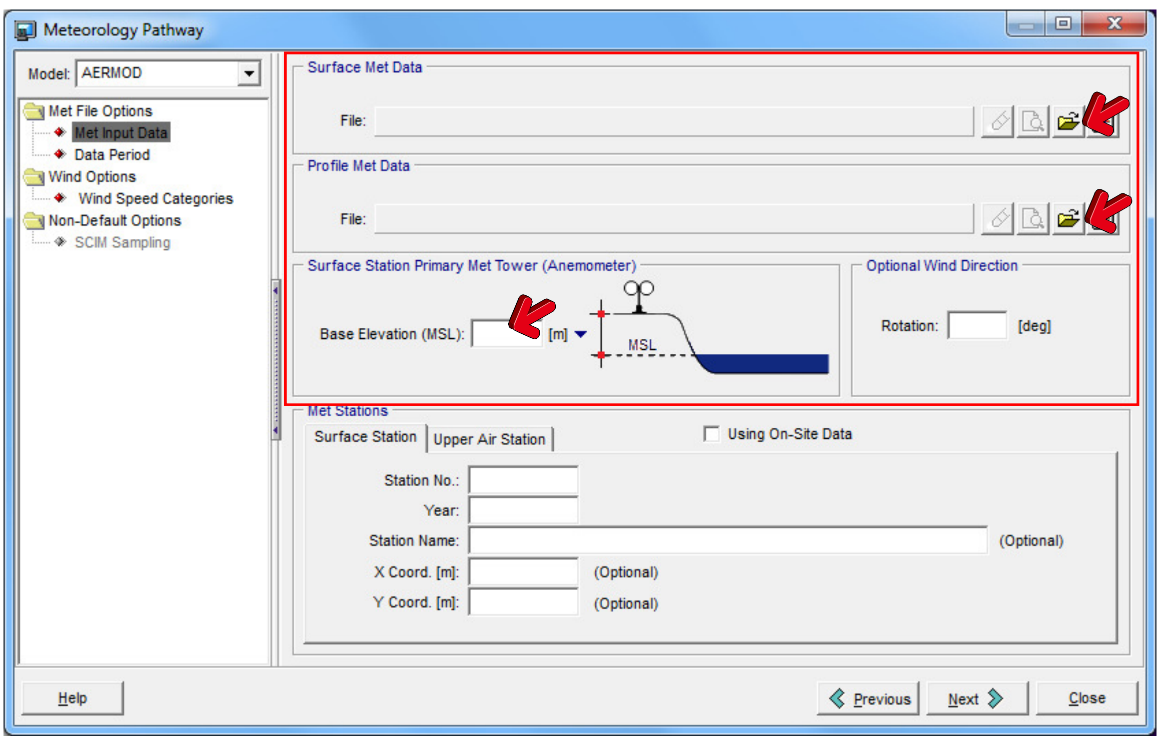
After you preprocess your surface (*.SAM) and upper air (*.UA) met data using **AERMET View**, two (2) meteorological output files will be generated:

1. Surface Met Data (*.SFC)
2. Profile Met Data (*.PFL)

Under the **Meteorology Pathway – Met Input Data** window, specify the Surface Met Data file (*.SFC) and the Profile Met Data file (*.PFL) generated by AERMET.

Under the same window, specify the base elevation for the surface station as:

Base Elevation (MSL) = 1543 [m]



Lakes Environmental Software
E-mail: sales@webLakes.com
Web: www.webLakes.com

Having Problems?

If you have any problems with the met data you received from us or need additional information on the above steps, please do not hesitate to contact us by sending an email to:

sales@webLakes.com

When contacting us, please provide:

- Met data Order # MET133753
- Detailed description of the problem

Appendix K: Mitigated Emissions

	Total Sentinel Butterfield	Total White Knob	Total Processing Plant	Total Off-site	Total Project w/o White Knob Reductions	Total Project w/ White Knob Reductions
HC	2.69	-1.54	0.01	0.11	2.82	1.27
NOx	48.1	-26.4	0.10	2.07	50.3	23.9
CO	32.6	-21.1	0.07	0.50	33.1	12.0
SOx	0.0022	-0.0010	0.0000	0.0027	0.0049	0.0038
TSP	167	-151	3.57	2.93	174	23
PM10	55.2	-54.5	0.62	0.68	56.6	2.1
PM2.5	8.7	-12.5	0.17	0.25	9.1	-3.39
CO2	9,900	-4,978	28.3	0.1	9,929	4,951

Unpaved Road Emissions Factors

EF= k * (S/12)^a * (W/3)^b * [(N-P)/N]

	TSP	PM10	PM2.5	
k=	4.9	1.5	0.15	
a=	0.7	0.9	0.9	
b=	0.45	0.45	0.45	
N=	365	365	365	(days/yr)
P (Los Angeles-MDAB)=	33	33	33	(rain days/yr)

Sources: AP-42, Section 13.2.2 (Nov. 2006), CalEEMod User Manual Appendix D
CalEEMod User Manual, Appendix D

UNCONTROLLED FACTOR

S= 8.3 %

Control Factor = 0%

Parameter	Weight (tons)	TSP (lb/VMT)	PM10 E.F. (lb/VMT)	PM2.5 E.F. (lb/VMT)
Full =	120	19.91	5.66	0.57
Empty =	45	12.80	3.64	0.36
Average =	82.5	16.36	4.65	0.47
Annual Average[1] =	---	14.88	4.23	0.42

UNMITIGATED FACTOR

S= 8.3 %

Control Factor[2] = 75%

Parameter	Weight (tons)	TSP (lb/VMT)	PM10 E.F. (lb/VMT)	PM2.5 E.F. (lb/VMT)
Full =	120	4.98	1.42	0.14
Empty =	45	3.20	0.91	0.09
Average =	82.5	4.09	1.16	0.12
Annual Avg.[1] =	---	3.72	1.06	0.11

[1] Annual average emissions factors take into account the rainfall adjustment factor [(N-P)/N].
This adjustment factor is not included in the daily emissions estimate.
[2] The control factor for the unmitigated emissions is chemical dust suppressants applied 0.15 g/sq.yd./month as reported in 2008.

Paved Road Emissions Factors

EF= k * (sL)^a * (W)^b * (1-P/4N)

	TSP	PM10	PM2.5
k=	0.011	0.0022	0.00054
a=	0.91	0.91	0.91
b=	1.02	1.02	1.02
P=	33	33	33
N=	365	365	365

Source: AP-42, Section 13.2.1 (Jan. 2011)

OFFSITE

sL= 0.1 g/m^2

Parameter	Weight (tons)	TSP (lb/VMT)	PM10 E.F. (lb/VMT)	PM2.5 E.F. (lb/VMT)
Full =	40	0.0583	0.0117	0.0029
Empty =	12	0.0171	0.0034	0.0008
Average =	26	0.0377	0.0075	0.0018
Annual Avg.[1] =	---	0.0368	0.0074	0.0018

[1] Annual average emissions factors take into account the rainfall adjustment factor [(N-P)/N].
This adjustment factor is not included in the hourly and daily emissions estimates.
Default silt loading in CalEEMod is 0.1 g/m2 and is used to model offsite road emissions.

MITIGATED

All Roads

S= 8.3 %

Control Factor[2] = 80%

Parameter	Weight (tons)	TSP (lb/VMT)	PM10 E.F. (lb/VMT)	PM2.5 E.F. (lb/VMT)
Full =	120	3.98	1.13	0.11
Empty =	45	2.56	0.73	0.07
Average =	82.5	3.27	0.93	0.09
Annual Avg.[1] =	---	2.98	0.85	0.08

Road to B5 Pad

S= 8.3 %

Control Factor[2] = 80%

Parameter	Weight (tons)	TSP (lb/VMT)	PM10 E.F. (lb/VMT)	PM2.5 E.F. (lb/VMT)
Full =	120	3.98	1.13	0.11
Empty =	45	2.56	0.73	0.07
Average =	82.5	3.27	0.93	0.09
Annual Avg.[1] =	---	2.98	0.85	0.08

Baseline

	A			B		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,618.07	15.34	1.84	962.78	11.05	1.33
VMT (%)	1.21%	0.99%	1.05%	0.72%	0.71%	0.76%
TSP - Dust	6,018.41	57.06	6.85	3,581.04	41.09	4.93
PM10 - Dust	1,711.42	16.23	1.95	1,018.32	11.68	1.40
PM2.5 - Dust	171.14	1.62	0.19	101.83	1.17	0.14
TSP - Exhaust	36.22	0.34	0.04	21.55	0.25	0.03
PM10 - Exhaust	36.22	0.34	0.04	21.55	0.25	0.03
PM2.5 - Exhaust	33.32	0.32	0.04	19.83	0.23	0.03
HC	62.81	0.60	0.07	37.37	0.43	0.05
NOx	1,160	11.00	1.32	690	7.92	0.95
CO	757	7.17	0.86	450	5.17	0.62
SOx	0.05	0.00	0.00	0.03	0.00	0.00
CO2	121.05	-	-	72.03	-	-

Project 1.40 scale factor from Project VMT/yr over Baseline VMT/yr

	A			B		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	7,319.05	45.77	5.49	7,340.91	46.04	5.52
VMT (%)	3.91%	3.90%	3.90%	3.92%	3.92%	3.92%
TSP - Dust	21,778.55	136.18	16.34	21,843.58	136.98	16.44
PM10 - Dust	6,193.03	38.73	4.65	6,211.53	38.95	4.67
PM2.5 - Dust	619.30	3.87	0.46	621.15	3.90	0.47
TSP - Exhaust	163.84	1.02	0.12	164.33	1.03	0.12
PM10 - Exhaust	163.84	1.02	0.12	164.33	1.03	0.12
PM2.5 - Exhaust	150.73	0.94	0.11	151.18	0.95	0.11
HC	284.11	1.78	0.21	284.96	1.79	0.21
NOx	5,246.83	32.81	3.94	5,262.50	33.00	3.96
CO	3,422.78	21.40	2.57	3,433.00	0.90	0.11
SOx	0.22	0.00	0.00	0.22	0.00	0.00
CO2 (tons)	547.54	-	-	549.17	-	-

Increment

	A			B		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	5,700.98	30.42	3.65	6,378.13	34.99	4.20
TSP - Dust	15,760.14	79.12	9.49	18,262.54	95.90	11.51
PM10 - Dust	4,481.61	22.50	2.70	5,193.21	27.27	3.27
PM2.5 - Dust	448.16	2.25	0.27	519.32	2.73	0.33
TSP - Exhaust	127.62	0.68	0.08	142.78	0.78	0.09
PM10 - Exhaust	127.62	0.68	0.08	142.78	0.78	0.09
PM2.5 - Exhaust	117.41	0.63	0.08	131.35	0.72	0.09
HC	221.30	1.18	0.14	247.58	1.36	0.16
NOx	4,086.88	21.81	2.62	4,572.31	25.08	3.01
CO	2,666.08	14.23	1.71	2,982.75	-4.27	-0.51
SOx	0.17	0.00	0.00	0.19	0.00	0.00
CO2 (tons)	426.49	-	-	477.15	-	-

Baseline

	C			D		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,355.33	16.39	1.97	-	-	-
VMT (%)	1.01%	1.05%	1.13%	0.00%	0.00%	0.00%
TSP - Dust	5,041.15	60.95	7.31	-	-	-
PM10 - Dust	1,433.52	17.33	2.08	-	-	-
PM2.5 - Dust	143.35	1.73	0.21	-	-	-
TSP - Exhaust	30.34	0.37	0.04	-	-	-
PM10 - Exhaust	30.34	0.37	0.04	-	-	-
PM2.5 - Exhaust	27.91	0.34	0.04	-	-	-
HC	52.61	0.64	0.08	-	-	-
NOx	972	11.75	1.41	-	-	-
CO	634	7.66	0.92	-	-	-
SOx	0.04	0.00	0.00	-	-	-
CO2	101.39	-	-	-	-	-

Project

	C			D		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	6,135.41	38.52	4.62	-	-	-
VMT (%)	3.28%	3.28%	3.28%	0.00%	0.00%	0.00%
TSP - Dust	18,256.50	114.63	13.76	-	-	-
PM10 - Dust	5,191.49	32.60	3.91	-	-	-
PM2.5 - Dust	519.15	3.26	0.39	-	-	-
TSP - Exhaust	137.34	0.86	0.10	-	-	-
PM10 - Exhaust	137.34	0.86	0.10	-	-	-
PM2.5 - Exhaust	126.35	0.79	0.10	-	-	-
HC	238.16	1.50	0.18	-	-	-
NOx	4,398.31	27.62	3.31	-	-	-
CO	2,869.24	18.02	2.16	-	-	-
SOx	0.18	0.00	0.00	-	-	-
CO2 (tons)	458.99	-	-	-	-	-

Increment

	C			D		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	4,780.08	22.14	2.66	-	-	-
TSP - Dust	13,215.36	53.69	6.44	-	-	-
PM10 - Dust	3,757.97	15.27	1.83	-	-	-
PM2.5 - Dust	375.80	1.53	0.18	-	-	-
TSP - Exhaust	107.00	0.50	0.06	-	-	-
PM10 - Exhaust	107.00	0.50	0.06	-	-	-
PM2.5 - Exhaust	98.44	0.46	0.05	-	-	-
HC	185.55	0.86	0.10	-	-	-
NOx	3,426.71	15.87	1.90	-	-	-
CO	2,235.42	10.35	1.24	-	-	-
SOx	0.14	0.00	0.00	-	-	-
CO2 (tons)	357.60	-	-	-	-	-

Baseline

	E			F		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	8,012.74	93.45	11.21	-	-	-
VMT (%)	6.00%	6.01%	6.42%	0.00%	0.00%	0.00%
TSP - Dust	29,803.34	347.60	41.71	-	-	-
PM10 - Dust	8,475.00	98.85	11.86	-	-	-
PM2.5 - Dust	847.50	9.88	1.19	-	-	-
TSP - Exhaust	179.37	2.09	0.25	-	-	-
PM10 - Exhaust	179.37	2.09	0.25	-	-	-
PM2.5 - Exhaust	165.02	1.92	0.23	-	-	-
HC	311.04	3.63	0.44	-	-	-
NOx	5,744	66.99	8.04	-	-	-
CO	3,747	43.70	5.24	-	-	-
SOx	0.24	0.00	0.00	-	-	-
CO2	599.43	-	-	-	-	-

Project

	E			F		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	34,529.77	216.74	26.01	-	-	-
VMT (%)	18.46%	18.47%	18.47%	0.00%	0.00%	0.00%
TSP - Dust	102,746.66	644.93	77.39	-	-	-
PM10 - Dust	29,217.45	183.39	22.01	-	-	-
PM2.5 - Dust	2,921.74	18.34	2.20	-	-	-
TSP - Exhaust	772.95	4.85	0.58	-	-	-
PM10 - Exhaust	772.95	4.85	0.58	-	-	-
PM2.5 - Exhaust	711.12	4.46	0.54	-	-	-
HC	1,340.37	8.41	1.01	-	-	-
NOx	24,753.46	155.37	18.64	-	-	-
CO	16,147.95	101.36	12.16	-	-	-
SOx	1.03	0.01	0.00	-	-	-
CO2 (tons)	2,583.16	-	-	-	-	-

Increment

	E			F		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	26,517.04	123.29	14.79	-	-	-
TSP - Dust	72,943.32	297.33	35.68	-	-	-
PM10 - Dust	20,742.45	84.55	10.15	-	-	-
PM2.5 - Dust	2,074.25	8.45	1.01	-	-	-
TSP - Exhaust	593.59	2.76	0.33	-	-	-
PM10 - Exhaust	593.59	2.76	0.33	-	-	-
PM2.5 - Exhaust	546.10	2.54	0.30	-	-	-
HC	1,029.33	4.79	0.57	-	-	-
NOx	19,009.34	88.38	10.61	-	-	-
CO	12,400.77	57.65	6.92	-	-	-
SOx	0.79	0.00	0.00	-	-	-
CO2 (tons)	1,983.73	-	-	-	-	-

Baseline

	G			H		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	72,587.16	815.66	97.88	33,745.62	416.59	41.66
VMT (%)	54.34%	52.46%	56.04%	25.26%	26.79%	23.85%
TSP - Dust	269,987.62	3,033.83	364.06	125,516.67	1,549.49	154.95
PM10 - Dust	76,774.75	862.71	103.53	35,692.42	440.62	44.06
PM2.5 - Dust	7,677.47	86.27	10.35	3,569.24	44.06	4.41
TSP - Exhaust	1,624.87	18.26	2.19	755.40	9.33	0.93
PM10 - Exhaust	1,624.87	18.26	2.19	755.40	9.33	0.93
PM2.5 - Exhaust	1,494.88	16.80	2.02	694.97	8.58	0.86
HC	2,817.67	31.66	3.80	1,309.93	16.17	1.62
NOx	52,036	584.72	70.17	24,191	298.64	29.86
CO	33,946	381.44	45.77	15,781	194.82	19.48
SOx	2.17	0.02	0.00	1.01	0.01	0.00
CO2	5,430.22	-	-	2,524.50	-	-

Project

	G			H		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	130,505.05	818.42	98.21	-	-	-
VMT (%)	69.76%	69.75%	69.75%	0.00%	0.00%	0.00%
TSP - Dust	388,330.34	2,435.28	292.23	-	-	-
PM10 - Dust	110,427.15	692.51	83.10	-	-	-
PM2.5 - Dust	11,042.72	69.25	8.31	-	-	-
TSP - Exhaust	2,921.37	18.32	2.20	-	-	-
PM10 - Exhaust	2,921.37	18.32	2.20	-	-	-
PM2.5 - Exhaust	2,687.66	16.85	2.02	-	-	-
HC	5,065.92	31.77	3.81	-	-	-
NOx	93,555.53	586.70	70.40	-	-	-
CO	61,031.06	382.74	45.93	-	-	-
SOx	3.89	0.02	0.00	-	-	-
CO2 (tons)	9,763.04	-	-	-	-	-

Increment

	G			H		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	57,917.89	2.76	0.33	-33,745.62	-416.59	-41.66
TSP - Dust	118,342.72	-598.55	-71.83	-125,516.67	-1,549.49	-154.95
PM10 - Dust	33,652.40	-170.21	-20.42	-35,692.42	-440.62	-44.06
PM2.5 - Dust	3,365.24	-17.02	-2.04	-3,569.24	-44.06	-4.41
TSP - Exhaust	1,296.50	0.06	0.01	-755.40	-9.33	-0.93
PM10 - Exhaust	1,296.50	0.06	0.01	-755.40	-9.33	-0.93
PM2.5 - Exhaust	1,192.78	0.06	0.01	-694.97	-8.58	-0.86
HC	2,248.24	0.11	0.01	-1,309.93	-16.17	-1.62
NOx	41,519.76	1.98	0.24	-24,191.32	-298.64	-29.86
CO	27,085.46	1.29	0.16	-15,781.23	-194.82	-19.48
SOx	1.73	0.00	0.00	-1.01	-0.01	-0.00
CO2 (tons)	4,332.82	-	-	-2,524.50	-	-

Baseline

	I			J		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,204.93	14.10	1.57	8,719.27	106.44	10.64
VMT (%)	0.90%	0.91%	0.90%	6.53%	6.85%	6.09%
TSP - Dust	4,481.74	52.45	5.83	32,431.27	395.90	39.59
PM10 - Dust	1,274.45	14.92	1.66	9,222.28	112.58	11.26
PM2.5 - Dust	127.44	1.49	0.17	922.23	11.26	1.13
TSP - Exhaust	26.97	0.32	0.04	195.18	2.38	0.24
PM10 - Exhaust	26.97	0.32	0.04	195.18	2.38	0.24
PM2.5 - Exhaust	24.81	0.29	0.03	179.57	2.19	0.22
HC	46.77	0.55	0.06	338.46	4.13	0.41
NOx	864	10.11	1.12	6,251	76.30	7.63
CO	563	6.59	0.73	4,078	49.78	4.98
SOx	0.04	0.00	0.00	0.26	0.00	0.00
CO2	90.14	-	-	652.29	-	-

Project

	I			J		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,253.54	7.86	0.94	-	-	-
VMT (%)	0.67%	0.67%	0.67%	0.00%	0.00%	0.00%
TSP - Dust	3,730.02	23.39	2.81	-	-	-
PM10 - Dust	1,060.68	6.65	0.80	-	-	-
PM2.5 - Dust	106.07	0.67	0.08	-	-	-
TSP - Exhaust	28.06	0.18	0.02	-	-	-
PM10 - Exhaust	28.06	0.18	0.02	-	-	-
PM2.5 - Exhaust	25.82	0.16	0.02	-	-	-
HC	48.66	0.31	0.04	-	-	-
NOx	898.63	5.64	0.68	-	-	-
CO	586.22	3.68	0.44	-	-	-
SOx	0.04	0.00	0.00	-	-	-
CO2 (tons)	93.78	-	-	-	-	-

Increment

	I			J		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	48.60	-6.24	-0.62	-8,719.27	-106.44	-10.64
TSP - Dust	-751.73	-29.06	-3.02	-32,431.27	-395.90	-39.59
PM10 - Dust	-213.76	-8.26	-0.86	-9,222.28	-112.58	-11.26
PM2.5 - Dust	-21.38	-0.83	-0.09	-922.23	-11.26	-1.13
TSP - Exhaust	1.09	-0.14	-0.01	-195.18	-2.38	-0.24
PM10 - Exhaust	1.09	-0.14	-0.01	-195.18	-2.38	-0.24
PM2.5 - Exhaust	1.00	-0.13	-0.01	-179.57	-2.19	-0.22
HC	1.89	-0.24	-0.02	-338.46	-4.13	-0.41
NOx	34.84	-4.47	-0.45	-6,250.60	-76.30	-7.63
CO	22.73	-2.92	-0.29	-4,077.59	-49.78	-4.98
SOx	0.00	-0.00	-0.00	-0.26	-0.00	-0.00
CO2 (tons)	3.64	-	-	-652.29	-	-

Baseline

	K			L		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	20,421.14	239.00	26.56	5,383.71	65.72	6.57
VMT (%)	0.00%	0.00%	0.00%	4.03%	4.23%	3.76%
TSP - Dust	751.91	8.80	0.98	20,024.68	244.45	24.44
PM10 - Dust	150.38	1.76	0.20	5,694.30	69.51	6.95
PM2.5 - Dust	36.91	0.43	0.05	569.43	6.95	0.70
TSP - Exhaust	31.80	0.37	0.04	120.51	1.47	0.15
PM10 - Exhaust	31.80	0.37	0.04	120.51	1.47	0.15
PM2.5 - Exhaust	29.25	0.34	0.04	110.87	1.35	0.14
HC	29.32	0.34	0.04	208.98	2.55	0.26
NOx	553.40	6.48	0.72	3,859	47.11	4.71
CO	132.81	1.55	0.17	2,518	30.73	3.07
SOx	0.72	0.01	0.00	0.16	0.00	0.00
CO2	-	-	-	402.75	-	-

Project

	K			L		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	28,452.92	178.43	21.41	-	-	-
VMT (%)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
TSP - Dust	1,047.65	6.57	0.79	-	-	-
PM10 - Dust	209.53	1.31	0.16	-	-	-
PM2.5 - Dust	51.43	0.32	0.04	-	-	-
TSP - Exhaust	44.30	0.28	0.03	-	-	-
PM10 - Exhaust	44.30	0.28	0.03	-	-	-
PM2.5 - Exhaust	40.76	0.26	0.03	-	-	-
HC	40.85	0.26	0.03	-	-	-
NOx	771.05	4.84	0.58	-	-	-
CO	185.05	1.16	0.14	-	-	-
SOx	1.01	0.01	0.00	-	-	-
CO2 (tons)	-	-	-	-	-	-

Increment

	K			L		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	8,031.78	-60.57	-5.14	-5,383.71	-65.72	-6.57
TSP - Dust	295.73	-2.23	-0.19	-20,024.68	-244.45	-24.44
PM10 - Dust	59.15	-0.45	-0.04	-5,694.30	-69.51	-6.95
PM2.5 - Dust	14.52	-0.11	-0.01	-569.43	-6.95	-0.70
TSP - Exhaust	12.51	-0.09	-0.01	-120.51	-1.47	-0.15
PM10 - Exhaust	12.51	-0.09	-0.01	-120.51	-1.47	-0.15
PM2.5 - Exhaust	11.51	-0.09	-0.01	-110.87	-1.35	-0.14
HC	11.53	-0.09	-0.01	-208.98	-2.55	-0.26
NOx	217.66	-1.64	-0.14	-3,859.43	-47.11	-4.71
CO	52.24	-0.39	-0.03	-2,517.71	-30.73	-3.07
SOx	0.28	-0.00	-0.00	-0.16	-0.00	-0.00
CO2 (tons)	-	-	-	-402.75	-	-

Baseline

	M			Total On-site		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	-	-	-	133,589.61	1,554.73	174.67
VMT (%)	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
TSP - Dust	-	-	-	496,885.92	5,782.81	649.67
PM10 - Dust	-	-	-	141,296.45	1,644.42	184.74
PM2.5 - Dust	-	-	-	14,129.64	164.44	18.47
TSP - Exhaust	-	-	-	2,990.42	34.80	3.91
PM10 - Exhaust	-	-	-	2,990.42	34.80	3.91
PM2.5 - Exhaust	-	-	-	2,751.18	32.02	3.60
HC	-	-	-	5,185.65	60.35	6.78
NOx	-	-	-	95,766.76	1,114.54	125.21
CO	-	-	-	62,473.56	727.07	81.68
SOx	-	-	-	3.99	0.05	0.01
CO2	-	-	-	9,994		

Project 1.40

	M			Total On-site		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	-	-	-	187,083.73	1,173.35	140.80
VMT (%)	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
TSP - Dust	-	-	-	556,685.65	3,491.40	418.97
PM10 - Dust	-	-	-	158,301.33	992.83	119.14
PM2.5 - Dust	-	-	-	15,830.13	99.28	11.91
TSP - Exhaust	-	-	-	4,187.89	26.27	3.15
PM10 - Exhaust	-	-	-	4,187.89	26.27	3.15
PM2.5 - Exhaust	-	-	-	3,852.86	24.16	2.90
HC	-	-	-	7,262.18	45.55	5.47
NOx	-	-	-	134,115.25	841.14	100.94
CO	-	-	-	84,004.83	504.98	60.65
SOx	-	-	-	5.58	0.04	0.00
CO2 (tons)	-	-	-	13,995.68	-	-

Increment

	M			Total On-site		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	-	-	-	53,494.12	-381.39	-33.87
TSP - Dust	-	-	-	59,799.73	-2,291.41	-230.71
PM10 - Dust	-	-	-	17,004.89	-651.59	-65.60
PM2.5 - Dust	-	-	-	1,700.49	-65.16	-6.56
TSP - Exhaust	-	-	-	1,197.47	-8.54	-0.76
PM10 - Exhaust	-	-	-	1,197.47	-8.54	-0.76
PM2.5 - Exhaust	-	-	-	1,101.67	-7.85	-0.70
HC	-	-	-	2,076.52	-14.80	-1.31
NOx	-	-	-	38,348.48	-273.40	-24.28
CO	-	-	-	21,531.28	-222.09	-21.04
SOx	-	-	-	1.60	-0.01	-0.00
CO2 (tons)	-	-	-	4,001.88	-	-

Baseline

	Total Offsite			Total		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	3,787,945.55	3,787,945.55	3,787,945.55	3,921,535.16	3,789,500.28	3,788,120.22
VMT (%)	100.00%	100.00%	100.00%			
TSP - Dust	139,473.29	139,473.29	139,473.29	636,359.21	145,256.10	140,122.96
PM10 - Dust	27,894.66	27,894.66	27,894.66	169,191.10	29,539.08	28,079.40
PM2.5 - Dust	6,846.87	6,846.87	6,846.87	20,976.52	7,011.31	6,865.35
TSP - Exhaust	5,898.06	5,898.06	5,898.06	8,888.47	5,932.86	5,901.97
PM10 - Exhaust	5,898.06	5,898.06	5,898.06	8,888.47	5,932.86	5,901.97
PM2.5 - Exhaust	5,426.21	5,426.21	5,426.21	8,177.40	5,458.23	5,429.81
HC	5,437.75	5,437.75	5,437.75	10,623.40	5,498.10	5,444.53
NOx	102,650.55	102,650.55	102,650.55	198,417.31	103,765.10	102,775.77
CO	24,635.25	24,635.25	24,635.25	87,108.81	25,362.33	24,716.94
SOx	133.92	133.92	133.92	137.90	133.96	133.92
CO2	7,067.22	7,067.22	7,067.22	17,061.02	7,067.22	7,067.22

Project

	Total Offsite			Total		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	3,940,736.00	3,940,736.00	3,940,736.00	4,127,819.73	3,941,909.35	3,940,876.80
VMT (%)	100.00%	100.00%	100.00%			
TSP - Dust	145,099.08	145,099.08	145,099.08	701,784.73	148,590.48	145,518.05
PM10 - Dust	29,019.82	29,019.82	29,019.82	187,321.15	30,012.64	29,138.96
PM2.5 - Dust	7,123.05	7,123.05	7,123.05	22,953.18	7,222.33	7,134.96
TSP - Exhaust	6,135.96	6,135.96	6,135.96	10,323.85	6,162.23	6,139.11
PM10 - Exhaust	6,135.96	6,135.96	6,135.96	10,323.85	6,162.23	6,139.11
PM2.5 - Exhaust	5,645.08	5,645.08	5,645.08	9,497.94	5,669.25	5,647.98
HC	5,657.09	5,657.09	5,657.09	12,919.27	5,702.63	5,662.55
NOx	106,791.06	106,791.06	106,791.06	240,906.31	107,632.20	106,892.00
CO	25,628.94	25,628.94	25,628.94	109,633.77	26,133.92	25,689.59
SOx	139.32	139.32	139.32	144.90	139.35	139.32
CO2 (tons)	7,339.35	7,339.35	7,339.35	21,335.03	7,339.35	7,339.35

Increment

	Total Offsite			Total		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	152,790.45	152,790.45	152,790.45	206,284.57	152,409.06	152,756.58
TSP - Dust	5,625.79	5,625.79	5,625.79	65,425.52	3,334.38	5,395.08
PM10 - Dust	1,125.16	1,125.16	1,125.16	18,130.05	473.56	1,059.55
PM2.5 - Dust	276.18	276.18	276.18	1,976.66	211.02	269.61
TSP - Exhaust	237.90	237.90	237.90	1,435.38	229.37	237.15
PM10 - Exhaust	237.90	237.90	237.90	1,435.38	229.37	237.15
PM2.5 - Exhaust	218.87	218.87	218.87	1,320.55	211.02	218.17
HC	219.34	219.34	219.34	2,295.86	204.53	218.02
NOx	4,140.51	4,140.51	4,140.51	42,488.99	3,867.10	4,116.23
CO	993.69	993.69	993.69	22,524.96	771.59	972.65
SOx	5.40	5.40	5.40	7.00	5.39	5.40
CO2 (tons)	272.13	272.13	272.13	4,274.01	272.13	272.13

2008 Emissions from Processing Plant Area

360,117 tons produced in 2008

EMISSION SOURCE / OPERATION / ACTIVITY	DEVICE ID #	CRITERIA EMISSIONS (tons per year)							
		TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	90,010	-	-	-	-	-	-	-	-
BLASTING	90,011	-	-	-	-	-	-	-	-
EXPLOSIVES	90,011	-	-	-	-	-	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	90012a	0.10	0.05	0.02	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	90006,7,8,9	0.00	0.00	0.00	-	-	-	-	-
Ball Mill #1	2,002	0.93	0.06	0.02	-	-	-	-	-
Tertiary Crushing	757	19.09	1.24	0.38	-	-	-	-	-
Roller Mill #1	763	1.99	0.13	0.04	-	-	-	-	-
Roller Mill #2	763	1.46	0.09	0.03	-	-	-	-	-
Roller Mill #3	3,935	0.89	0.06	0.02	-	-	-	-	-
Roller Mill #4	7,674	0.88	0.06	0.02	-	-	-	-	-
Surface Treating Plant	2,003	0.01	0.00	0.00	-	-	-	-	-
Rock Storage System/Plan	754	10.77	3.01	0.94	-	-	-	-	-
Optical Sorter	763	0.01	0.01	0.00	-	-	-	-	-
Coarse Product Storage System	2,009	0.27	0.04	0.01	-	-	-	-	-
Silo 81-70c	4,967	0.32	0.05	0.01	-	-	-	-	-
Bulk Loadout 82 System	2,007	0.09	0.01	0.00	-	-	-	-	-
Bulk Loadout 83 System	2,009	0.02	0.00	0.00	-	-	-	-	-
STOCKPILES - WIND EROSION	90,015	1.06	0.53	0.21	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	VARIOUS	0.03	0.03	0.03	0.07	0.26	0.00	0.00	0.07
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	90001,2								
PAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	90,013	16.99	5.01	0.77	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	90014a	11.25	5.62	2.25	-	-	-	-	-
	GRAND TOTAL	66.15	16.01	4.75	0.07	0.26	0.00	0.00	0.07

2008 Emissions from Sentinel-Butterfield Quarry Area

449,672 tons excavated in 2008

EMISSION SOURCE / OPERATION / ACTIVITY	DEVICE ID #	CRITERIA EMISSIONS (tons per year)							
		TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	90,010	0.22	0.18	0.18	-	-	-	-	-
BLASTING	90,011	10.42	5.42	0.31	-	-	-	-	-
EXPLOSIVES	30,502,514	-	-	-	2.95	0.75	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	90,012	0.05	0.02	0.01	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	90006,7,8,9	0.28	0.14	0.04	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	751	6.08	1.06	0.33	-	-	-	-	-
STOCKPILES - WIND EROSION	90,015	0.67	0.34	0.13	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	VARIOUS	0.03	0.03	0.03	0.08	0.38	0.03	0.03	0.00
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	90001,2								
UNPAVED ROADS - ENTRAINED DUST	90,013								
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	90,014	20.10	10.05	4.02	-	-	-	-	-
	GRAND TOTAL	37.84	17.23	5.05	3.03	1.12	0.03	0.03	0.00

2008 Emissions from White Knob Quarry Area

243,036 tons excavated in 2008

EMISSION SOURCE / OPERATION / ACTIVITY	DEVICE ID #	CRITERIA EMISSIONS (tons per year)							
		TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	90,010	0.12	0.10	0.10	-	-	-	-	-
BLASTING	90,011	2.84	1.47	0.09	-	-	-	-	-
EXPLOSIVES	90,011	-	-	-	1.94	0.49	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	90012a	11.01	5.35	1.64	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	90006,7,8,9	0.87	0.42	0.13	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	2,456	6.20	2.01	0.63	-	-	-	-	-
STOCKPILES - WIND EROSION	90,015	0.18	0.09	0.04	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	VARIOUS								
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	90001,2								
UNPAVED ROADS - ENTRAINED DUST	90,013								
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	90014a	20.66	10.33	4.13	-	-	-	-	-
	GRAND TOTAL	41.88	19.78	6.75	1.94	0.49	-	-	-

Notes: There are no paved roads on-site. Exhaust from stationary and portable equipment excludes White Knob generator which is calculated elsewhere. Exhaust from mobile/vehicular equipment and travel on unpaved roads is calculated elsewhere. Wind erosion is not expected to change because the active area that is disturbed on a daily basis will not change with project.

Baseline Emissions from Processing Plant Area

653,635 tons produced in Baseline

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	-	-	-	-	-	-	-	-	-
BLASTING	-	-	-	-	-	-	-	-	-
EXPLOSIVES	-	-	-	-	-	-	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	1.82	0.185	0.090	0.028	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	1.82	0.0072	0.0035	0.0011	-	-	-	-	-
Ball Mill #1	1.82	1.68	0.106	0.033	-	-	-	-	-
Tertiary Crushing	1.82	34.7	2.25	0.69	-	-	-	-	-
Roller Mill #1	1.82	3.61	0.242	0.076	-	-	-	-	-
Roller Mill #2	1.82	2.66	0.167	0.052	-	-	-	-	-
Roller Mill #3	1.82	1.62	0.104	0.033	-	-	-	-	-
Roller Mill #4	1.82	1.60	0.104	0.033	-	-	-	-	-
Surface Treating Plant	1.82	0.011	0.0010	0.0003	-	-	-	-	-
Rock Storage System/Plan	1.82	19.5	5.47	1.71	-	-	-	-	-
Optical Sorter	1.82	0.019	0.014	0.004	-	-	-	-	-
Coarse Product Storage System	1.82	0.48	0.080	0.025	-	-	-	-	-
Silo 81-70c	1.82	0.58	0.082	0.026	-	-	-	-	-
Bulk Loadout 82 System	1.82	0.16	0.025	0.008	-	-	-	-	-
Bulk Loadout 83 System	1.82	0.028	0.005	0.001	-	-	-	-	-
STOCKPILES - WIND EROSION	1.00	1.06	0.53	0.21	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	1.82	0.047	0.046	0.046	0.12	0.48	0.01	0.01	0.13
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
PAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	1.82	30.84	9.10	1.40	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	1.00	11.25	5.62	2.25	-	-	-	-	-
		110.03	24.04	6.62	0.12	0.48	0.01	0.01	0.13

Baseline Emissions from Sentinel-Butterfield Quarry Area

624,191 tons excavated in Baseline

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	1.39	0.31	0.25	0.25	-	-	-	-	-
BLASTING	1.39	14.46	7.52	0.43	-	-	-	-	-
EXPLOSIVES	1.39	-	-	-	4.09	1.04	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	2.57	28.27	13.75	4.20	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	1.39	0.39	0.19	0.06	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	1.39	8.43	1.48	0.46	-	-	-	-	-
STOCKPILES - WIND EROSION	1.00	0.67	0.34	0.13	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	1.39	0.04	0.04	0.04	0.11	0.52	0.042	0.037	0.0017
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	1.00	20.10	10.05	4.02	-	-	-	-	-
		72.66	33.61	9.59	4.2	1.6	0.042	0.037	0.0017

Baseline Emissions from White Knob Quarry Area

463,467 tons excavated in Baseline

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	1.91	0.23	0.19	0.19	-	-	-	-	-
BLASTING	1.91	5.41	2.81	0.16	-	-	-	-	-
EXPLOSIVES	1.91	-	-	-	3.71	0.94	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	1.91	20.99	10.21	3.12	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	1.91	1.65	0.81	0.25	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	1.91	11.83	3.83	1.20	-	-	-	-	-
STOCKPILES - WIND EROSION	1.00	0.18	0.09	0.04	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	-	-	-	-	-	-	-	-	-
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	1.00	20.66	10.33	4.13	-	-	-	-	-
		60.96	28.27	9.08	3.71	0.94	-	-	-

Note: Sentinel-Butterfield bulldozing scaled based on White Knob Quarry activity level to reflect increased overburden with project.

Project Plus Baseline Emissions from Processing Plant Area

680,000 tons produced with Project

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	-	-	-	-	-	-	-	-	-
BLASTING	-	-	-	-	-	-	-	-	-
EXPLOSIVES	-	-	-	-	-	-	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	1.89	0.19	0.09	0.03	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	1.89	0.01	0.00	0.00	-	-	-	-	-
Ball Mill #1	1.89	1.75	0.11	0.03	-	-	-	-	-
Tertiary Crushing	1.89	36.05	2.34	0.72	-	-	-	-	-
Roller Mill #1	1.89	3.75	0.25	0.08	-	-	-	-	-
Roller Mill #2	1.89	2.77	0.17	0.05	-	-	-	-	-
Roller Mill #3	1.89	1.68	0.11	0.03	-	-	-	-	-
Roller Mill #4	1.89	1.67	0.11	0.03	-	-	-	-	-
Surface Treating Plant	1.89	0.01	0.00	0.00	-	-	-	-	-
Rock Storage System/Plan	1.89	20.33	5.69	1.78	-	-	-	-	-
Optical Sorter	1.89	0.02	0.01	0.00	-	-	-	-	-
Coarse Product Storage System	1.89	0.50	0.08	0.03	-	-	-	-	-
Silo 81-70c	1.89	0.60	0.09	0.03	-	-	-	-	-
Bulk Loadout 82 System	1.89	0.16	0.03	0.01	-	-	-	-	-
Bulk Loadout 83 System	1.89	0.03	0.00	0.00	-	-	-	-	-
STOCKPILES - WIND EROSION	1.00	1.06	0.53	0.21	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	1.89	0.05	0.05	0.05	0.12	0.50	0.01	0.0054	0.13
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
PAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	1.89	32.08	9.47	1.45	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	1.00	11.25	5.62	2.25	-	-	-	-	-
		113.97	24.77	6.79	0.12	0.50	0.01	0.01	0.13

Project Plus Baseline Emissions from Sentinel-Butterfield Quarry Area

1,487,500 tons excavated with Project

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	3.31	0.74	0.60	0.60	-	-	-	-	-
BLASTING	3.31	34.46	17.92	1.03	-	-	-	-	-
EXPLOSIVES	3.31	-	-	-	9.75	2.47	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	6.12	41.84	20.35	6.22	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	3.31	0.92	0.45	0.14	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	3.31	20.10	3.52	1.09	-	-	-	-	-
STOCKPILES - WIND EROSION	1.00	0.67	0.34	0.13	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	3.31	0.09	0.09	0.09	0.27	1.24	0.10	0.088	0.0041
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	1.00	20.10	10.05	4.02	-	-	-	-	-
		118.91	53.31	13.32	10.02	3.72			

Project Plus Baseline Emissions from White Knob Quarry Area

- tons excavated with Project

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	-	-	-	-	-	-	-	-	-
BLASTING	-	-	-	-	-	-	-	-	-
EXPLOSIVES	-	-	-	-	-	-	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	-	-	-	-	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	-	-	-	-	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	-	-	-	-	-	-	-	-	-
STOCKPILES - WIND EROSION	-	-	-	-	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	-	-	-	-	-	-	-	-	-
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-

Note: Sentinel-Butterfield bulldozing scaled based on White Knob Quarry activity level to reflect increased overburden with project. Grading mitigated by watering . Baseline control efficiency from 2008 emissions inventory of 62.1% control was increased to 85.6% control from increased moisture in material affected due to watering.

Project Emissions from Processing Plant Area

Project Emissions 26,365 tons change from baseline

CRITERIA EMISSIONS (tons per year)

EMISSION SOURCE / OPERATION / ACTIVITY	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	-	-	-	-	-	-	-	-
BLASTING	-	-	-	-	-	-	-	-
EXPLOSIVES	-	-	-	-	-	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	0.01	0.00	0.00	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	0.00	0.00	0.00	-	-	-	-	-
Ball Mill #1	0.07	0.00	0.00	-	-	-	-	-
Tertiary Crushing	1.40	0.09	0.03	-	-	-	-	-
Roller Mill #1	0.15	0.01	0.00	-	-	-	-	-
Roller Mill #2	0.11	0.01	0.00	-	-	-	-	-
Roller Mill #3	0.07	0.00	0.00	-	-	-	-	-
Roller Mill #4	0.06	0.00	0.00	-	-	-	-	-
Surface Treating Plant	0.00	0.00	0.00	-	-	-	-	-
Rock Storage System/Plan	0.79	0.22	0.07	-	-	-	-	-
Optical Sorter	0.00	0.00	0.00	-	-	-	-	-
Coarse Product Storage System	0.02	0.00	0.00	-	-	-	-	-
Silo 81-70c	0.02	0.00	0.00	-	-	-	-	-
Bulk Loadout 82 System	0.01	0.00	0.00	-	-	-	-	-
Bulk Loadout 83 System	0.00	0.00	0.00	-	-	-	-	-
STOCKPILES - WIND EROSION	-	-	-	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.01
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-
PAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	1.24	0.37	0.06	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	-	-	-	-	-	-	-	-
	3.94	0.72	0.17	0.00	0.02	0.00	0.00	0.01

Project Emissions from Sentinel-Butterfield Quarry Area

Project Emissions 863,309 tons change from baseline

CRITERIA EMISSIONS (tons per year)

EMISSION SOURCE / OPERATION / ACTIVITY	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	0.43	0.35	0.35	-	-	-	-	-
BLASTING	20.00	10.40	0.60	-	-	-	-	-
EXPLOSIVES	-	-	-	5.66	1.44	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	13.57	6.60	2.02	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	0.53	0.26	0.08	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	11.66	2.04	0.63	-	-	-	-	-
STOCKPILES - WIND EROSION	-	-	-	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	0.05	0.05	0.05	0.16	0.72	0.06	0.05	0.00
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	-	-	-	-	-	-	-	-
	46.25	19.70	3.72	5.82	2.16	-0.04	-0.04	-0.00

Project Emissions from White Knob Quarry Area

Project Emissions -463,467 tons change from baseline

CRITERIA EMISSIONS (tons per year)

EMISSION SOURCE / OPERATION / ACTIVITY	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	-0.23	-0.19	-0.19	-	-	-	-	-
BLASTING	-5.41	-2.81	-0.16	-	-	-	-	-
EXPLOSIVES	-	-	-	-3.71	-0.94	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	-20.99	-10.21	-3.12	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	-1.65	-0.81	-0.25	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	-11.83	-3.83	-1.20	-	-	-	-	-
STOCKPILES - WIND EROSION	-0.18	-0.09	-0.04	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	-	-	-	-	-	-	-	-
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	-20.66	-10.33	-4.13	-	-	-	-	-
	-60.96	-28.27	-9.08	-3.71	-0.94	-	-	-

	VOL1	VOL2	VOL3	VOL4	VOL5	VOL6	VOL7	VOL8	VOL9	VOL10
MitTSPann	-3.50E-01	-8.14E-01	0.00E+00	-3.00E-01	-3.00E-01	1.14E-01	2.50E-01	8.23E-03	3.41E-01	7.46E-01
MitTSPday	-1.28E+00	-2.97E+00	0.00E+00	-1.09E+00	-1.09E+00	4.15E-01	9.12E-01	3.01E-02	1.24E+00	2.72E+00
MitPM10ann	-1.17E-01	-4.10E-01	0.00E+00	-1.48E-01	-1.48E-01	2.10E-02	1.29E-01	4.30E-03	6.40E-02	3.84E-01
MitPM10day	-4.29E-01	-1.50E+00	0.00E+00	-5.40E-01	-5.40E-01	7.66E-02	4.71E-01	1.57E-02	2.33E-01	1.40E+00
MitPM25ann	-4.03E-02	-1.27E-01	0.00E+00	-5.23E-02	-5.23E-02	5.06E-03	2.50E-02	1.71E-03	2.34E-02	7.15E-02
MitPM25day	-1.47E-01	-4.62E-01	0.00E+00	-1.91E-01	-1.91E-01	1.85E-02	9.12E-02	6.22E-03	8.53E-02	2.61E-01
TSPann (lb/yr/src)	-24344.179	-56602.499	0	-20836.774	-20836.774	7899.79756	17369.395	572.507122	23689.7697	51866.6732
TSPday (lb/day/src)	-243.44179	-566.02499	0	-208.36774	-208.36774	78.9979756	173.69395	5.72507122	236.897697	518.666732
PM10ann (lb/yr/src)	-8167.1132	-28507.675	0	-10281.845	-10281.845	1459.43901	8973.87565	298.702889	4446.23095	26680.1152
PM10day (lb/day/src)	-81.671132	-285.07675	0	-102.81845	-102.81845	14.5943901	89.7387565	2.98702889	44.4623095	266.801152
PM25ann (lb/yr/src)	-2803.8977	-8798.7133	0	-3636.8902	-3636.8902	351.818377	1736.9307	118.568524	1625.57054	4969.28041
PM25day (lb/day/src)	-28.038977	-87.987133	0	-36.368902	-36.368902	3.51818377	17.369307	1.18568524	16.2557054	49.6928041
TSPann (lb/yr)	-24,344	-56,602	0	-20,837	-20,837	7,900	17,369	573	23,690	51,867
TSPday (lb/day)	-243	-566	0	-208	-208	79	174	6	237	519
PM10ann (lb/yr)	-8,167	-28,508	0	-10,282	-10,282	1,459	8,974	299	4,446	26,680
PM10day (lb/day)	-82	-285	0	-103	-103	15	90	3	44	267
PM25ann (lb/yr)	-2,804	-8,799	0	-3,637	-3,637	352	1,737	119	1,626	4,969
PM25day (lb/day)	-28	-88	0	-36	-36	4	17	1	16	50
HC (lb/yr)	-640	-554	0	-16	-16	23	344	61	330	720
NOx (lb/yr)	-9,898	-8,146	0	-240	-240	174	5,076	893	7,092	10,584
CO (lb/yr)	-14,201	-5,306	0	-156	-156	112	2,822	581	7,437	6,894
SOx (lb/yr)	-0.305	-0.292	0	-0.009	-0.009	0.006	0.164	0.032	0.731	0.379
CO2 (ton/yr)	-584	-769	0	-23	-23	25	433	84	806	999
TSP (lb/yr)	-24,344	-56,602	0	-20,837	-20,837	7,900	17,369	573	23,690	51,867
PM10 (lb/yr)	-8,167	-28,508	0	-10,282	-10,282	1,459	8,974	299	4,446	26,680
PM2.5 (lb/yr)	-2,804	-8,799	0	-3,637	-3,637	352	1,737	119	1,626	4,969

	A	B	C	E0	G	327	H	I	J	K	L
MitTSPann	6.01E-03	1.56E-02	1.37E-02	1.96E-02	5.26E-03	0.00E+00	-8.90E-03	-2.70E-03	-1.30E-02	5.54E-05	-1.45E-02
MitTSPday	1.10E-02	2.99E-02	2.03E-02	2.92E-02	-9.61E-03	0.00E+00	-4.01E-02	-3.83E-02	-5.81E-02	-1.53E-04	-6.46E-02
MitPM10ann	1.74E-03	4.51E-03	3.97E-03	5.68E-03	1.54E-03	0.00E+00	-2.57E-03	-7.65E-04	-3.76E-03	1.29E-05	-4.18E-03
MitPM10day	3.20E-03	8.66E-03	5.91E-03	8.49E-03	-2.73E-03	0.00E+00	-1.16E-02	-1.10E-02	-1.68E-02	-3.55E-05	-1.86E-02
MitPM25ann	2.14E-04	5.51E-04	4.87E-04	6.98E-04	2.00E-04	0.00E+00	-3.01E-04	-7.33E-05	-4.40E-04	4.68E-06	-4.89E-04
MitPM25day	3.97E-04	1.06E-03	7.43E-04	1.07E-03	-2.72E-04	0.00E+00	-1.35E-03	-1.25E-03	-1.96E-03	-1.29E-05	-2.18E-03
TSPann (lb/yr/src)	418.098759	1082.66541	951.597207	1361.79462	365.869163		-618.98074	-187.66009	-906.29025	3.85298136	-1007.2595
TSPday (lb/day/src)	2.09995884	5.68721127	3.870112	5.55714444	-1.8302301		-7.6412474	-7.3003763	-11.063298	-0.0290572	-12.295853
PM10ann (lb/yr/src)	121.295568	313.881316	276.069581	395.111822	106.877374		-178.66577	-53.169119	-261.59625	0.89565587	-290.74053
PM10day (lb/day/src)	0.60997849	1.65021006	1.12585241	1.6168252	-0.5203162		-2.2056087	-2.100959	-3.1933668	-0.0067546	-3.5491379
PM25ann (lb/yr/src)	14.8833978	38.274931	33.8742506	48.5249021	13.9388933		-20.902984	-5.0938793	-30.605429	0.32529078	-34.015161
PM25day (lb/day/src)	0.07569418	0.20280163	0.14161156	0.20358981	-0.0518766		-0.258045	-0.2387362	-0.3736076	-0.0024532	-0.4152311
TSPann (lb/yr)	15,888	18,405	13,322	73,537	119,639	-72	-126,272	-751	-32,626	308	-20,145
TSPday (lb/day)	80	97	54	300	-598		-1,559	-29	-398	-2	-246
PM10ann (lb/yr)	4,609	5,336	3,865	21,336	34,949	-20	-36,448	-213	-9,417	72	-5,815
PM10day (lb/day)	23	28	16	87	-170		-450	-8	-115	-1	-71
PM25ann (lb/yr)	566	651	474	2,620	4,558	-2	-4,264	-20	-1,102	26	-680
PM25day (lb/day)	3	3	2	11	-17		-53	-1	-13	0	-8
HC (lb/yr)	221	248	186	1,029	2,248	0	-1,310	2	-338	12	-209
NOx (lb/yr)	4,087	4,572	3,427	19,009	41,520	0	-24,191	35	-6,251	218	-3,859
CO (lb/yr)	2,666	2,983	2,235	12,401	27,085	0	-15,781	23	-4,078	52	-2,518
SOx (lb/yr)	0.170	0.190	0.143	0.791	1.728	0.000	-1.007	0.001	-0.260	0.284	-0.161
CO2 (ton/yr)	426	477	358	1,984	4,333	0	-2,524	4	-652	0	-403
TSP (lb/yr)	15,888	18,405	13,322	73,537	119,639	-72	-126,272	-751	-32,626	308	-20,145
PM10 (lb/yr)	4,609	5,336	3,865	21,336	34,949	-20	-36,448	-213	-9,417	72	-5,815
PM2.5 (lb/yr)	566	651	474	2,620	4,558	-2	-4,264	-20	-1,102	26	-680

	M
MitTSPann	0.00E+00
MitTSPday	0.00E+00
MitPM10ann	0.00E+00
MitPM10day	0.00E+00
MitPM25ann	0.00E+00
MitPM25day	0.00E+00
TSPann (lb/yr/src)	0
TSPday (lb/day/src)	0
PM10ann (lb/yr/src)	0
PM10day (lb/day/src)	0
PM25ann (lb/yr/src)	0
PM25day (lb/day/src)	0
TSPann (lb/yr)	0
TSPday (lb/day)	0
PM10ann (lb/yr)	0
PM10day (lb/day)	0
PM25ann (lb/yr)	0
PM25day (lb/day)	0
HC (lb/yr)	0
NOx (lb/yr)	0
CO (lb/yr)	0
SOx (lb/yr)	0
CO2 (ton/yr)	0
TSP (lb/yr)	0
PM10 (lb/yr)	0
PM2.5 (lb/yr)	0

	Total Sentinel Butterfield	Total White Knob	Total Processing Plant	Total Off-site
MitTSPann				
MitTSPday				
MitPM10ann				
MitPM10day				
MitPM25ann				
MitPM25day				
TSPann (lb/yr/src)				
TSPday (lb/day/src)				
PM10ann (lb/yr/src)				
PM10day (lb/day/src)				
PM25ann (lb/yr/src)				
PM25day (lb/day/src)				
TSPann (lb/yr)	334,290	-301,664	7,149	
TSPday (lb/day)	867	-3,429	50	
PM10ann (lb/yr)	110,494	-108,919	1,247	
PM10day (lb/day)	388	-1,208	6	
PM25ann (lb/yr)	17,319	-24,923	331	
PM25day (lb/day)	87	-263	3	
HC (lb/yr)	5,387	-3,085	25	219.3
NOx (lb/yr)	96,259	-52,825	209	4140.5
CO (lb/yr)	65,105	-42,195	134	993.7
SOx (lb/yr)	4	-2	0	5.4
CO2 (ton/yr)	9,900	-4,978	28	272.1
TSP (lb/yr)	334,290	-301,664	7,149	5863.7
PM10 (lb/yr)	110,494	-108,919	1,247	1363.1
PM2.5 (lb/yr)	17,319	-24,923	331	495.0

	Total Project w/o White Knob	Total Project w/ White Knob
MitTSPann		
MitTSPday		
MitPM10ann		
MitPM10day		
MitPM25ann		
MitPM25day		
TSPann (lb/yr/src)		
TSPday (lb/day/src)		
PM10ann (lb/yr/src)		
PM10day (lb/day/src)		
PM25ann (lb/yr/src)		
PM25day (lb/day/src)		
TSPann (lb/yr)	341,439	39,775
TSPday (lb/day)	917	-2,512
PM10ann (lb/yr)	111,741	2,822
PM10day (lb/day)	394	-814
PM25ann (lb/yr)	17,651	-7,272
PM25day (lb/day)	89	-174
HC (lb/yr)	5,631	2,547
NOx (lb/yr)	100,609	47,784
CO (lb/yr)	66,233	24,037
SOx (lb/yr)	10	8
CO2 (ton/yr)	10,201	5,223
TSP (lb/yr)	347,303	45,639
PM10 (lb/yr)	113,104	4,185
PM2.5 (lb/yr)	18,146	-6,777

Volume Source Identifiers

LOCATION VOL1 VOLUME 498771.228 3802380.117 0
** DESCRSRC White Knob Crushing
LOCATION VOL2 VOLUME 498410.694 3802532.330 0
** DESCRSRC White Knob Pit
LOCATION VOL3 VOLUME 499367.635 3802416.274 0
** DESCRSRC White Ridge Pit
LOCATION VOL4 VOLUME 499169.967 3802653.553 0
** DESCRSRC OB1
LOCATION VOL5 VOLUME 498786.819 3802108.559 0
** DESCRSRC OB2
LOCATION VOL6 VOLUME 505294.247 3804607.151 0
** DESCRSRC Processing Plant
LOCATION VOL7 VOLUME 504322.000 3798695.000 0
** DESCRSRC Butterfield Pit
LOCATION VOL8 VOLUME 505430.000 3797960.000 0
** DESCRSRC B5 Pad Expansion
** DESCRSRC Butterfield-Sentinel Crushing
LOCATION VOL10 VOLUME 505808.000 3798770.000 (
** DESCRSRC Sentinel Pit

Appendix L: Alternative 4 Emissions

	Total Sentinel Butterfield	Total White Knob	Total Processing Plant	Total Offsite	Total Project w/o White Knob Reductions	Total Project w/ White Knob Reductions
HC	1.61	-0.97	0.01	0.11	1.74	0.77
NOx	29.0	-15.8	0.10	2.07	31.1	15.3
CO	19.9	-14.2	0.07	0.50	20.4	6.2
SOx	0.0013	-0.0006	0.0000	0.0027	0.0040	0.0035
TSP	155	-103	4.04	2.93	162	60
PM10	52.0	-38.5	0.76	0.68	53.4	14.9
PM2.5	8.6	-10.6	0.18	0.25	9.1	-1.58
CO2	5,980	-2,765	28.3	272.13	6,280	3,515

2008 Emissions from Processing Plant Area

360,117 tons produced in 2008

EMISSION SOURCE / OPERATION / ACTIVITY	DEVICE ID #	CRITERIA EMISSIONS (tons per year)							
		TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	90,010	-	-	-	-	-	-	-	-
BLASTING	90,011	-	-	-	-	-	-	-	-
EXPLOSIVES	90,011	-	-	-	-	-	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	90012a	0.10	0.05	0.02	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	90006,7,8,9	0.00	0.00	0.00	-	-	-	-	-
Ball Mill #1	2,002	0.93	0.06	0.02	-	-	-	-	-
Tertiary Crushing	757	19.09	1.24	0.38	-	-	-	-	-
Roller Mill #1	763	1.99	0.13	0.04	-	-	-	-	-
Roller Mill #2	763	1.46	0.09	0.03	-	-	-	-	-
Roller Mill #3	3,935	0.89	0.06	0.02	-	-	-	-	-
Roller Mill #4	7,674	0.88	0.06	0.02	-	-	-	-	-
Surface Treating Plant	2,003	0.01	0.00	0.00	-	-	-	-	-
Rock Storage System/Plan	754	10.77	3.01	0.94	-	-	-	-	-
Optical Sorter	763	0.01	0.01	0.00	-	-	-	-	-
Coarse Product Storage System	2,009	0.27	0.04	0.01	-	-	-	-	-
Silo 81-70c	4,967	0.32	0.05	0.01	-	-	-	-	-
Bulk Loadout 82 System	2,007	0.09	0.01	0.00	-	-	-	-	-
Bulk Loadout 83 System	2,009	0.02	0.00	0.00	-	-	-	-	-
STOCKPILES - WIND EROSION	90,015	1.06	0.53	0.21	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	VARIOUS	0.03	0.03	0.03	0.07	0.26	0.00	0.00	0.07
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	90001,2								
PAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	90,013	16.99	5.01	0.77	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	90014a	11.25	5.62	2.25	-	-	-	-	-
	GRAND TOTAL	66.15	16.01	4.75	0.07	0.26	0.00	0.00	0.07

2008 Emissions from Sentinel-Butterfield Quarry Area

449,672 tons excavated in 2008

EMISSION SOURCE / OPERATION / ACTIVITY	DEVICE ID #	CRITERIA EMISSIONS (tons per year)							
		TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	90,010	0.22	0.18	0.18	-	-	-	-	-
BLASTING	90,011	10.42	5.42	0.31	-	-	-	-	-
EXPLOSIVES	30,502,514	-	-	-	2.95	0.75	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	90,012	0.05	0.02	0.01	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	90006,7,8,9	0.28	0.14	0.04	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	751	6.08	1.06	0.33	-	-	-	-	-
STOCKPILES - WIND EROSION	90,015	0.67	0.34	0.13	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	VARIOUS	0.03	0.03	0.03	0.08	0.38	0.03	0.03	0.00
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	90001,2								
UNPAVED ROADS - ENTRAINED DUST	90,013								
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	90,014	20.10	10.05	4.02	-	-	-	-	-
	GRAND TOTAL	37.84	17.23	5.05	3.03	1.12	0.03	0.03	0.00

2008 Emissions from White Knob Quarry Area

243,036 tons excavated in 2008

EMISSION SOURCE / OPERATION / ACTIVITY	DEVICE ID #	CRITERIA EMISSIONS (tons per year)							
		TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	90,010	0.12	0.10	0.10	-	-	-	-	-
BLASTING	90,011	2.84	1.47	0.09	-	-	-	-	-
EXPLOSIVES	90,011	-	-	-	1.94	0.49	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	90012a	11.01	5.35	1.64	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	90006,7,8,9	0.87	0.42	0.13	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	2,456	6.20	2.01	0.63	-	-	-	-	-
STOCKPILES - WIND EROSION	90,015	0.18	0.09	0.04	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	VARIOUS								
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	90001,2								
UNPAVED ROADS - ENTRAINED DUST	90,013								
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	90014a	20.66	10.33	4.13	-	-	-	-	-
	GRAND TOTAL	41.88	19.78	6.75	1.94	0.49	-	-	-

Notes: There are no paved roads on-site. Exhaust from stationary and portable equipment excludes White Knob generator which is calculated elsewhere. Exhaust from mobile/vehicular equipment and travel on unpaved roads is calculated elsewhere. Wind erosion is not expected to change because the active area that is disturbed on a daily basis will not change with project.

Baseline Emissions from Processing Plant Area

653,635 tons produced in Baseline

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	-	-	-	-	-	-	-	-	-
BLASTING	-	-	-	-	-	-	-	-	-
EXPLOSIVES	-	-	-	-	-	-	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	1.82	0.185	0.090	0.028	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	1.82	0.0072	0.0035	0.0011	-	-	-	-	-
Ball Mill #1	1.82	1.68	0.106	0.033	-	-	-	-	-
Tertiary Crushing	1.82	34.7	2.25	0.69	-	-	-	-	-
Roller Mill #1	1.82	3.61	0.242	0.076	-	-	-	-	-
Roller Mill #2	1.82	2.66	0.167	0.052	-	-	-	-	-
Roller Mill #3	1.82	1.62	0.104	0.033	-	-	-	-	-
Roller Mill #4	1.82	1.60	0.104	0.033	-	-	-	-	-
Surface Treating Plant	1.82	0.011	0.0010	0.0003	-	-	-	-	-
Rock Storage System/Plan	1.82	19.5	5.47	1.71	-	-	-	-	-
Optical Sorter	1.82	0.019	0.014	0.004	-	-	-	-	-
Coarse Product Storage System	1.82	0.48	0.080	0.025	-	-	-	-	-
Silo 81-70c	1.82	0.58	0.082	0.026	-	-	-	-	-
Bulk Loadout 82 System	1.82	0.16	0.025	0.008	-	-	-	-	-
Bulk Loadout 83 System	1.82	0.028	0.005	0.001	-	-	-	-	-
STOCKPILES - WIND EROSION	1.00	1.06	0.53	0.21	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	1.82	0.047	0.046	0.046	0.12	0.48	0.01	0.01	0.13
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
PAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	1.82	30.84	9.10	1.40	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	1.00	11.25	5.62	2.25	-	-	-	-	-
		110.03	24.04	6.62	0.12	0.48	0.01	0.01	0.13

Baseline Emissions from Sentinel-Butterfield Quarry Area

624,191 tons excavated in Baseline

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	1.39	0.31	0.25	0.25	-	-	-	-	-
BLASTING	1.39	14.46	7.52	0.43	-	-	-	-	-
EXPLOSIVES	1.39	-	-	-	4.09	1.04	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	2.57	28.27	13.75	4.20	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	1.39	0.39	0.19	0.06	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	1.39	8.43	1.48	0.46	-	-	-	-	-
STOCKPILES - WIND EROSION	1.00	0.67	0.34	0.13	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	1.39	0.04	0.04	0.04	0.11	0.52	0.042	0.037	0.0017
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	1.00	20.10	10.05	4.02	-	-	-	-	-
		72.66	33.61	9.59	4.2	1.6	0.042	0.037	0.0017

Baseline Emissions from White Knob Quarry Area

463,467 tons excavated in Baseline

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	1.91	0.23	0.19	0.19	-	-	-	-	-
BLASTING	1.91	5.41	2.81	0.16	-	-	-	-	-
EXPLOSIVES	1.91	-	-	-	3.71	0.94	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	1.91	20.99	10.21	3.12	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	1.91	1.65	0.81	0.25	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	1.91	11.83	3.83	1.20	-	-	-	-	-
STOCKPILES - WIND EROSION	1.00	0.18	0.09	0.04	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	-	-	-	-	-	-	-	-	-
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	1.00	20.66	10.33	4.13	-	-	-	-	-
		60.96	28.27	9.08	3.71	0.94	-	-	-

Note: Sentinel-Butterfield bulldozing scaled based on White Knob Quarry activity level to reflect increased overburden with project.

Project Plus Baseline Emissions from Processing Plant Area

680,000 tons produced with Project

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	-	-	-	-	-	-	-	-	-
BLASTING	-	-	-	-	-	-	-	-	-
EXPLOSIVES	-	-	-	-	-	-	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	1.89	0.19	0.09	0.03	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	1.89	0.01	0.00	0.00	-	-	-	-	-
Ball Mill #1	1.89	1.75	0.11	0.03	-	-	-	-	-
Tertiary Crushing	1.89	36.05	2.34	0.72	-	-	-	-	-
Roller Mill #1	1.89	3.75	0.25	0.08	-	-	-	-	-
Roller Mill #2	1.89	2.77	0.17	0.05	-	-	-	-	-
Roller Mill #3	1.89	1.68	0.11	0.03	-	-	-	-	-
Roller Mill #4	1.89	1.67	0.11	0.03	-	-	-	-	-
Surface Treating Plant	1.89	0.01	0.00	0.00	-	-	-	-	-
Rock Storage System/Plan	1.89	20.33	5.69	1.78	-	-	-	-	-
Optical Sorter	1.89	0.02	0.01	0.00	-	-	-	-	-
Coarse Product Storage System	1.89	0.50	0.08	0.03	-	-	-	-	-
Silo 81-70c	1.89	0.60	0.09	0.03	-	-	-	-	-
Bulk Loadout 82 System	1.89	0.16	0.03	0.01	-	-	-	-	-
Bulk Loadout 83 System	1.89	0.03	0.00	0.00	-	-	-	-	-
STOCKPILES - WIND EROSION	1.00	1.06	0.53	0.21	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	1.89	0.05	0.05	0.05	0.12	0.50	0.01	0.0054	0.13
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
PAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	1.89	32.08	9.47	1.45	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	1.00	11.25	5.62	2.25	-	-	-	-	-
		113.97	24.77	6.79	0.12	0.50	0.01	0.01	0.13

Project Plus Baseline Emissions from Sentinel-Butterfield Quarry Area

1,145,375 tons excavated with Project

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	2.55	0.57	0.46	0.46	-	-	-	-	-
BLASTING	2.55	26.53	13.80	0.80	-	-	-	-	-
EXPLOSIVES	2.55	-	-	-	7.51	1.91	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	4.71	51.87	25.23	7.71	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	2.55	0.71	0.34	0.11	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	2.55	15.47	2.71	0.84	-	-	-	-	-
STOCKPILES - WIND EROSION	1.00	0.67	0.34	0.13	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	2.55	0.07	0.07	0.07	0.21	0.96	0.08	0.067	0.0032
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	1.00	20.10	10.05	4.02	-	-	-	-	-
		116.00	53.00	14.13	7.72	2.86			

Project Plus Baseline Emissions from White Knob Quarry Area

- tons excavated with Project

EMISSION SOURCE / OPERATION / ACTIVITY		CRITERIA EMISSIONS (tons per year)							
	Multiplier	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	-	-	-	-	-	-	-	-	-
BLASTING	-	-	-	-	-	-	-	-	-
EXPLOSIVES	-	-	-	-	-	-	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	-	-	-	-	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	-	-	-	-	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	-	-	-	-	-	-	-	-	-
STOCKPILES - WIND EROSION	-	-	-	-	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	-	-	-	-	-	-	-	-	-
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-

Note: Sentinel-Butterfield bulldozing scaled based on White Knob Quarry activity level to reflect increased overburden with project.

Project Emissions from Processing Plant Area

Project Emissions 26,365 tons change from baseline

EMISSION SOURCE / OPERATION / ACTIVITY	CRITERIA EMISSIONS (tons per year)							
	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	-	-	-	-	-	-	-	-
BLASTING	-	-	-	-	-	-	-	-
EXPLOSIVES	-	-	-	-	-	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	0.01	0.00	0.00	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	0.00	0.00	0.00	-	-	-	-	-
Ball Mill #1	0.07	0.00	0.00	-	-	-	-	-
Tertiary Crushing	1.40	0.09	0.03	-	-	-	-	-
Roller Mill #1	0.15	0.01	0.00	-	-	-	-	-
Roller Mill #2	0.11	0.01	0.00	-	-	-	-	-
Roller Mill #3	0.07	0.00	0.00	-	-	-	-	-
Roller Mill #4	0.06	0.00	0.00	-	-	-	-	-
Surface Treating Plant	0.00	0.00	0.00	-	-	-	-	-
Rock Storage System/Plan	0.79	0.22	0.07	-	-	-	-	-
Optical Sorter	0.00	0.00	0.00	-	-	-	-	-
Coarse Product Storage System	0.02	0.00	0.00	-	-	-	-	-
Silo 81-70c	0.02	0.00	0.00	-	-	-	-	-
Bulk Loadout 82 System	0.01	0.00	0.00	-	-	-	-	-
Bulk Loadout 83 System	0.00	0.00	0.00	-	-	-	-	-
STOCKPILES - WIND EROSION	-	-	-	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.01
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-
PAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	1.24	0.37	0.06	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	-	-	-	-	-	-	-	-
	3.94	0.72	0.17	0.00	0.02	0.00	0.00	0.01

Project Emissions from Sentinel-Butterfield Quarry Area

Project Emissions 521,184 tons change from baseline

EMISSION SOURCE / OPERATION / ACTIVITY	CRITERIA EMISSIONS (tons per year)							
	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	0.26	0.21	0.21	-	-	-	-	-
BLASTING	12.07	6.28	0.36	-	-	-	-	-
EXPLOSIVES	-	-	-	3.42	0.87	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	23.60	11.48	3.51	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	0.32	0.16	0.05	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	7.04	1.23	0.38	-	-	-	-	-
STOCKPILES - WIND EROSION	-	-	-	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	0.03	0.03	0.03	0.09	0.43	0.03	0.03	0.00
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	-	-	-	-	-	-	-	-
	43.33	19.39	4.54	3.51	1.30	-0.04	-0.04	-0.00

Project Emissions from White Knob Quarry Area

Project Emissions -463,467 tons change from baseline

EMISSION SOURCE / OPERATION / ACTIVITY	CRITERIA EMISSIONS (tons per year)							
	TSP	PM10	PM2.5	CO	NOx	TOG	ROG / VOC	SOx
DRILLING	-0.23	-0.19	-0.19	-	-	-	-	-
BLASTING	-5.41	-2.81	-0.16	-	-	-	-	-
EXPLOSIVES	-	-	-	-3.71	-0.94	-	-	-
BULLDOZING, SCRAPING AND GRADING OF MATERIAL	-20.99	-10.21	-3.12	-	-	-	-	-
LOADING OF MATERIAL(S) MINE / QUARRY / PIT	-1.65	-0.81	-0.25	-	-	-	-	-
AGGREGATE HANDLING, CRUSHING, AND SCREENING #1	-11.83	-3.83	-1.20	-	-	-	-	-
STOCKPILES - WIND EROSION	-0.18	-0.09	-0.04	-	-	-	-	-
EXHAUST - STATIONARY AND PORTABLE EQUIPMENT	-	-	-	-	-	-	-	-
EXHAUST - MOBILE AND VEHICULAR EQUIPMENT	-	-	-	-	-	-	-	-
UNPAVED ROADS - ENTRAINED DUST	-	-	-	-	-	-	-	-
WIND EROSION FROM UNPAVED OPERATIONAL AREAS AND ROA	-20.66	-10.33	-4.13	-	-	-	-	-
	-60.96	-28.27	-9.08	-3.71	-0.94	-	-	-

Baseline

	VOL1	WK Crusher		VOL2	WK Pit		VOL3	WR Pit	
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	1,002,598.38	10,025.98	1,671.00	1,320,206.27	13,202.06	2,200.34	-	-	-
HC (lb)	640.25	6.40	1.07	554.35	5.54	0.92	-	-	-
NOx (lb)	9,898.01	98.98	16.50	8,146.06	81.46	13.58	-	-	-
PM (lb)	327.63	3.28	0.55	358.76	3.59	0.60	-	-	-
CO (lb)	14,200.65	142.01	23.67	5,306.16	53.06	8.84	-	-	-
SOx (lb)	0.31	0.00	0.00	0.29	0.00	0.00	-	-	-
CO2 (tons)	583.94	5.84	0.97	768.93	7.69	1.28	-	-	-

Project

	VOL1	WK Crusher		VOL2	WK Pit		VOL3	WR Pit	
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	-	-	-	-	-	-	-	-	-
HC (lb)	-	-	-	-	-	-	-	-	-
NOx (lb)	-	-	-	-	-	-	-	-	-
PM (lb)	-	-	-	-	-	-	-	-	-
CO (lb)	-	-	-	-	-	-	-	-	-
SOx (lb)	-	-	-	-	-	-	-	-	-
CO2 (tons)	-	-	-	-	-	-	-	-	-

Increment

	VOL1	WK Crusher		VOL2	WK Pit		VOL3	WR Pit	
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	-1,002,598.38	-10,025.98	-1,671.00	-1,320,206.27	-13,202.06	-2,200.34	-	-	-
HC (lb)	-640.25	-6.40	-1.07	-554.35	-5.54	-0.92	-	-	-
NOx (lb)	-9,898.01	-98.98	-16.50	-8,146.06	-81.46	-13.58	-	-	-
PM (lb)	-327.63	-3.28	-0.55	-358.76	-3.59	-0.60	-	-	-
CO (lb)	-14,200.65	-142.01	-23.67	-5,306.16	-53.06	-8.84	-	-	-
SOx (lb)	-0.31	-0.00	-0.00	-0.29	-0.00	-0.00	-	-	-
CO2 (tons)	-583.94	-5.84	-0.97	-768.93	-7.69	-1.28	-	-	-

Baseline

	VOL4	OB1		VOL5	OB2		VOL6	Plant		VOL7	BF Pit	
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	38,829.60	388.30	64.72	38,829.60	388.30	64.72	1,050,976.27	10,509.76	1,751.63	271,610.60	2,716.11	452.68
HC (lb)	16.30	0.16	0.03	16.30	0.16	0.03	578.23	5.78	0.96	114.05	1.14	0.19
NOx (lb)	239.59	2.40	0.40	239.59	2.40	0.40	4,316.04	43.16	7.19	1,675.92	16.76	2.79
PM (lb)	10.55	0.11	0.02	10.55	0.11	0.02	396.46	3.96	0.66	73.81	0.74	0.12
CO (lb)	156.06	1.56	0.26	156.06	1.56	0.26	2,764.55	27.65	4.61	1,091.65	10.92	1.82
SOx (lb)	0.01	0.00	0.00	0.01	0.00	0.00	0.14	0.00	0.00	0.06	0.00	0.00
CO2 (tons)	22.62	0.23	0.04	22.62	0.23	0.04	612.12	6.12	1.02	158.19	1.58	0.26

Project

	VOL4	OB1		VOL5	OB2		VOL6	Plant		VOL7	BF Pit	
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	-	-	-	-	-	-	1,093,368.41	10,933.68	1,822.28	417,091.86	4,170.92	695.15
HC (lb)	-	-	-	-	-	-	601.55	6.02	1.00	187.97	1.88	0.31
NOx (lb)	-	-	-	-	-	-	4,490.13	44.90	7.48	2,773.07	27.73	4.62
PM (lb)	-	-	-	-	-	-	412.45	4.12	0.69	127.19	1.27	0.21
CO (lb)	-	-	-	-	-	-	2,876.06	28.76	4.79	1,607.40	16.07	2.68
SOx (lb)	-	-	-	-	-	-	0.15	0.00	0.00	0.09	0.00	0.00
CO2 (tons)	-	-	-	-	-	-	636.81	6.37	1.06	242.93	2.43	0.40

Increment

	VOL4	OB1		VOL5	OB2		VOL6	Plant		VOL7	BF Pit	
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	-38,829.60	-388.30	-64.72	-38,829.60	-388.30	-64.72	42,392.14	423.92	70.65	145,481.26	1,454.81	242.47
HC (lb)	-16.30	-0.16	-0.03	-16.30	-0.16	-0.03	23.32	0.23	0.04	73.92	0.74	0.12
NOx (lb)	-239.59	-2.40	-0.40	-239.59	-2.40	-0.40	174.09	1.74	0.29	1,097.15	10.97	1.83
PM (lb)	-10.55	-0.11	-0.02	-10.55	-0.11	-0.02	15.99	0.16	0.03	53.39	0.53	0.09
CO (lb)	-156.06	-1.56	-0.26	-156.06	-1.56	-0.26	111.51	1.12	0.19	515.74	5.16	0.86
SOx (lb)	-0.01	-0.00	-0.00	-0.01	-0.00	-0.00	0.01	0.00	0.00	0.03	0.00	0.00
CO2 (tons)	-22.62	-0.23	-0.04	-22.62	-0.23	-0.04	24.69	0.25	0.04	84.73	0.85	0.14

Baseline

	VOL8	B5		VOL9	SB Crusher		VOL10	Sen Pit		Total		
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	104,590.39	1,045.90	174.32	209,180.78	2,091.81	348.63	1,506,426.05	15,064.26	2,510.71	5,543,247.93	55,432.48	9,238.75
HC (lb)	43.92	0.44	0.07	87.83	0.88	0.15	632.55	6.33	1.05	2,683.79	26.84	4.47
NOx (lb)	645.35	6.45	1.08	1,290.71	12.91	2.15	9,295.09	92.95	15.49	35,746.35	357.46	59.58
PM (lb)	28.42	0.28	0.05	56.84	0.57	0.09	409.36	4.09	0.68	1,672.38	16.72	2.79
CO (lb)	420.37	4.20	0.70	840.74	8.41	1.40	6,054.61	60.55	10.09	30,990.85	309.91	51.65
SOx (lb)	0.02	0.00	0.00	0.05	0.00	0.00	0.33	0.00	0.00	1.22	0.01	0.00
CO2 (tons)	60.92	0.61	0.10	121.83	1.22	0.20	877.39	8.77	1.46	3,228.55	32.29	5.38

Project

	VOL8	B5		VOL9	SB Crusher		VOL10	Sen Pit		Total		
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	191,920.67	1,919.21	319.87	1,989,179.67	19,891.80	3,315.30	2,845,559.54	28,455.60	4,742.60	6,537,120.15	65,371.20	10,895.20
HC (lb)	80.59	0.81	0.13	321.71	3.22	0.54	1,194.85	11.95	1.99	2,386.67	23.87	3.98
NOx (lb)	1,184.21	11.84	1.97	6,454.98	64.55	10.76	17,557.93	175.58	29.26	32,460.32	324.60	54.10
PM (lb)	52.15	0.52	0.09	243.62	2.44	0.41	773.26	7.73	1.29	1,608.67	16.09	2.68
CO (lb)	771.37	7.71	1.29	6,373.72	63.74	10.62	11,436.84	114.37	19.06	23,065.38	230.65	38.44
SOx (lb)	0.04	0.00	0.00	0.60	0.01	0.00	0.63	0.01	0.00	1.51	0.02	0.00
CO2 (tons)	111.78	1.12	0.19	714.44	7.14	1.19	1,657.34	16.57	2.76	3,363.29	33.63	5.61

Increment

	VOL8	B5		VOL9	SB Crusher		VOL10	Sen Pit				
	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour	Per Year	Per Day	Per Hour
hp-hr	87,330.28	873.30	145.55	1,779,998.89	17,799.99	2,966.66	1,339,133.49	13,391.33	2,231.89	993,872.22	9,938.72	1,656.45
HC (lb)	36.67	0.37	0.06	233.88	2.34	0.39	562.30	5.62	0.94	-297.12	-2.97	-0.50
NOx (lb)	538.85	5.39	0.90	5,164.27	51.64	8.61	8,262.84	82.63	13.77	-3,286.03	-32.86	-5.48
PM (lb)	23.73	0.24	0.04	186.77	1.87	0.31	363.90	3.64	0.61	-63.71	-0.64	-0.11
CO (lb)	351.00	3.51	0.58	5,532.98	55.33	9.22	5,382.23	53.82	8.97	-7,925.47	-79.25	-13.21
SOx (lb)	0.02	0.00	0.00	0.55	0.01	0.00	0.30	0.00	0.00	0.29	0.00	0.00
CO2 (tons)	50.86	0.51	0.08	592.61	5.93	0.99	779.95	7.80	1.30	134.74	1.35	0.22

Baseline Offroad Activity		**Baseline Fleet Characteristics**					
	Avg. (hp-hr)	HC (lb/yr)	NOx (lb/yr)	PM (lb/yr)	CO (lb/yr)	SOx (lb/yr)	CO2 (tpy)
Pit Subtotal	3,644,992	1,643	24,234	1,112	14,047	0.81	2,123
Plant Subtotal	1,050,976	624	3,785	325	2,668	0.15	612
Roads Subtotal	17,158,834	6,706	115,562	4,059	111,011	3.99	9,994
Total w/o Generato	21,854,802	8,973	143,581	5,495	127,726	4.95	12,729
Total w/ Generator	22,702,082	9,548	152,520	5,781	141,303	5.22	13,222
Generator	847,280	575	8,940	285	13,576	0.27	493

Baseline Offroad Activity		**2012 Fleet Characteristics**					
	Avg. (hp-hr)	HC (lb/yr)	NOx (lb/yr)	PM (lb/yr)	CO (lb/yr)	SOx (lb/yr)	CO2 (tpy)
Pit Subtotal	3,644,992	1,531	22,491	990	14,650	0.81	2,123
Plant Subtotal	1,041,576	578	4,316	396	2,765	0.14	612
Roads Subtotal	17,158,834	5,186	95,767	2,990	62,474	3.99	9,994
Total w/o Generato	21,845,402	7,294	122,573	4,377	79,888	4.94	12,729
Total w/ Generator	22,692,682	7,869	131,513	4,663	93,464	5.21	13,222

Baseline Offroad Allocations					
	Ton Excavated	hp-hr	Pit (hp-hr)	Fill (hp-hr)	Loadout (hp-hr)
White Knob	463,467	1,553,184	1,320,206	77,659	155,318
Sentinel	528,841	1,772,266	1,506,426	88,613	177,227
Butterfield	95,351	319,542	271,611	15,977	31,954
Total	1,087,658	3,644,992	3,098,243	182,250	364,499

Project Offroad Allocations						
	Ton Excavated	hp-hr	Pit (hp-hr)	Fill (hp-hr)	Loadout (hp-h	Percentage
White Knob	-	-				
Sentinel	998,952	3,347,717	2,845,560	167,386	334,772	87%
Butterfield	146,423	490,696	417,092	24,535	49,070	13%
Total	1,145,375	3,838,413	3,262,651	191,921	383,841	

Project Offroad Activity		**Baseline Fleet Characteristics**					
	Avg. (hp-hr)	HC (lb/yr)	NOx (lb/yr)	PM (lb/yr)	CO (lb/yr)	SOx (lb/yr)	CO2 (tpy)
Pit Subtotal	3,838,413	1,612	23,684	1,043	15,427	0.85	2,236
Plant Subtotal	1,093,368	607	4,531	416	2,902	0.15	643
Roads Subtotal	22,495,165	6,798	125,550	3,920	81,903	5.23	13,102
Mobile Crusher	1,605,338	161	4,087	139	4,831	0.51	491
Total	29,032,285	9,178	157,851	5,519	105,063	6.74	16,471
Increment	6,339,603	1,308	26,338	856	11,598	1.53	3,249

Mobile Crusher							
Tier 3 E.F. (g/hp-hr	(CalEEMod 2013.2)	0.12	2.32	0.088	2.6	0.000276	528.4
Fuel Correction Factor		0.720	0.948	0.852	1	1	1
0.525	load factor						

10% of Pit Subtotal assumed to be loading at plant
5% of Pit Subtotal assumed to be placement of fill
85% of Pit Subtotal assumed to be excavation
100 maximum days are used to estimate daily emissions from annual activity levels
6 maximum hours are assumed to occur on the maximum day in order to determine peak hour

Activity Data								Vehicle Miles Traveled per Year						
Locaiton	**Tons/Year**	**Tons/Day**	**Tons/Hour**	**Trips/Year**	**Trips/Day**	**Trips/Hour**	**Links Traveled**	**A - Butterfield Pit**	**B - Waste Pile**	**C - West Road**	**D - Sentinel Crusher**	**E - Senteniel Pit**	**F - Crushed Pile**	**G - Sentinel/Butterfield to Plant**
Ore to Primary Crusher								4,065	1,800	1,460	-	6,045	-	38,000
Sentinel	535,438	4,361	523	14,278	116	14	E	-	-	-	-	16,347	-	-
Butterfield 3	78,483	639	77	2,093	17	2	A, C	1,611		579	-	-	-	-
White Knob	183,379	4,000	400	4,890	107	11	J	-	-	-	-	-	-	-
Sentinel - Butterfield	613,921	5,000	600	16,371	133	16	-							
TOTAL	797,300	9,000	1,000	21,261	240	27	-							
Ore Hauled to Plant									-					
Sentinel	456,664	3,719.24	446.31	12,178	99	12	G, I	-	-	-	-	-	-	87,643
Butterfield 3	66,936	545.15	65.42	1,785	15	2	G, I	-	-	-	-	-	-	12,846
White Knob	156,400	3,412	341	4,171	91	9	H, L, I	-	-	-	-	-	-	-
Sentinel - Butterfield	523,600	4,264	512	13,963	114	14	-							
TOTAL	680,000	7,676	853	18,133	205	23	-							
Waste Crusher Fines														
Sentinel	78,775	642	77	2,101	17	2	B, C	-	716	581	-	-	-	-
Butterfield 3	11,546	94	11	308	3	0	B, C	-	105	85	-	-	-	-
White Knob	26,979	588	59	719	16	2	L	-	-	-	-	-	-	-
Sentinel - Butterfield	90,321	736	88	2,409	20	2	-							
TOTAL	117,300	1,324	147	3,128	35	4	-							
Waste Rock Not Processed														
Sentinel	463,514	3,775	453	12,360	101	12	B, C, E	-	4,214	3,418	-	14,151	-	-
Butterfield 3	67,940	553	66	1,812	15	2	A, B	1,395	618	-	-	-	-	-
White Knob	158,746	3,463	346	4,233	92	9	J, L	-	-	-	-	-	-	-
Sentinel - Butterfield	531,454	4,328	519	14,172	115	14	-							
TOTAL	690,200	7,791	866	18,405	208	23	-							
	1,487,500	tons, total excavated						A	B	C	D	E	F	G
Total VMT:	not used on this page.							3,006	5,653	4,663	-	30,498	-	100,489
% of VMT:	not used on this page.							2%	3%	3%	0%	17%	0%	57%

	Alternative	Baseline % of Total		Baseline % of BS
76.1%	67%	50%	sentinel	87.2%
23.9%	10%	7%	butterfield	12.8%
	23%	42%	white knob	
	77%	58%	butterfield and sentinel	

Locaiton	Tons/Year	Tons/Day	Tons/Hour	H - White Ridge to Plant	I - Plant Feed	J - White Knob Pit	K - On-Road Trucks	L - Crusher to White Ridge	M - White Ridge Pit
		Activity Data		Vehicle Miles Traveled per Year					
Ore to Primary Crusher				24,260	365	3,725	6,186	2,300	1,300
Sentinel	535,438	4,361	523	-	-	-	-	-	-
Butterfield 3	78,483	639	77	-	-	-	-	-	-
White Knob	183,379	4,000	400	-	-	3,450	-	-	-
Sentinel - Butterfield	613,921	5,000	600		-	-		-	-
TOTAL	797,300	9,000	1,000		-	-		-	-
Ore Hauled to Plant						-		-	-
Sentinel	456,664	3,719.24	446.31	-	842	-	-	-	-
Butterfield 3	66,936	545.15	65.42	-	123	-	-	-	-
White Knob	156,400	3,412	341	19,163	288	-	-	1,817	-
Sentinel - Butterfield	523,600	4,264	512			-		-	-
TOTAL	680,000	7,676	853			-	21,244.85	-	-
Waste Crusher Fines						-		-	-
Sentinel	78,775	642	77	-	-	-	-	-	-
Butterfield 3	11,546	94	11	-	-	-	-	-	-
White Knob	26,979	588	59	-	-	-	-	313	-
Sentinel - Butterfield	90,321	736	88			-		-	-
TOTAL	117,300	1,324	147			-		-	-
Waste Rock Not Processed						-		-	-
Sentinel	463,514	3,775	453	-	-	-	-	-	-
Butterfield 3	67,940	553	66	-	-	-	-	-	-
White Knob	158,746	3,463	346	-	-	2,987	-	1,844	-
Sentinel - Butterfield	531,454	4,328	519			-		-	-
TOTAL	690,200	7,791	866						
	1,487,500	tons, total excavated		H	I	J	K	L	M
Total VMT:	not used on this page.			19,163	1,254	6,436	21,245	3,974	-
% of VMT:	not used on this page.			11%	1%	4%		2%	0%
									100%

	Alternative	Baseline % (
76.1%	67%	50%
23.9%	10%	7%
	23%	42%
	77%	58%

Locaiton	Tons/Year	Tons/Day	Tons/Hour	A - Butterfield Pit	B - Waste Pile	C - West Road	D - Butterfield Crusher	E - Senteniel Pit	F - Crushed Pile	G - Sentinel/ Butterfield to Plant
			Activity Data	Vehicle Miles Traveled per Day						
Ore to Primary Crusher				4,065	1,800	1,460	-	6,045	-	38,000
Sentinel	535,438	4,361	523	-	-	-	-	133.14	-	-
Butterfield 3	78,483	639	77	13.12		4.71	-	-	-	-
White Knob	183,379	4,000	400	-	-	-	-	-	-	-
Sentinel - Butterfield	613,921	5,000	600							
TOTAL	797,300	9,000	1,000							
Ore Hauled to Plant										
Sentinel	456,664	3,719.24	446.31	-	-	-	-	-	-	713.79
Butterfield 3	66,936	545.15	65.42	-	-	-	-	-	-	104.63
White Knob	156,400	3,412	341	-	-	-	-	-	-	-
Sentinel - Butterfield	523,600	4,264	512							
TOTAL	680,000	7,676	853							
Waste Crusher Fines										
Sentinel	78,775	642	77	-	5.83	4.73	-	-	-	-
Butterfield 3	11,546	94	11	-	0.85	0.69	-	-	-	-
White Knob	26,979	588	59	-	-	-	-	-	-	-
Sentinel - Butterfield	90,321	736	88							
TOTAL	117,300	1,324	147							
Waste Rock Not Processed										
Sentinel	463,514	3,775	453	-	34.32	27.84	-	115.25	-	-
Butterfield 3	67,940	553	66	11.36	5.03	-	-	-	-	-
White Knob	158,746	3,463	346	-	-	-	-	-	-	-
Sentinel - Butterfield	531,454	4,328	519							
TOTAL	690,200	7,791	866							
	1,487,500	tons, total excavated		A	B	C	D	E	F	G
Total VMT:	not used on this page.			24	46	38	-	248	-	818
% of VMT:	not used on this page.			1%	3%	2%	0%	14%	0%	45%

	Alternative	Baseline % (
76.1%	67%	50%
23.9%	10%	7%
	23%	42%
	77%	58%

			Activity Data	Vehicle Miles Traveled per Day					
Locaiton	**Tons/Year**	**Tons/Day**	**Tons/Hour**	**H - White Ridge to Plant**	**I - Plant Feed**	**J - White Knob Pit**	**K - On-Road Trucks**	**L - Crusher to White Ridge**	**M - White Ridge Pit**
Ore to Primary Crusher				24,260	365	3,725	6,186	2,300	1,300
Sentinel	535,438	4,361	523	-	-	-	-	-	-
Butterfield 3	78,483	639	77	-	-	-	-	-	-
White Knob	183,379	4,000	400	-	-	75.25	-	-	-
Sentinel - Butterfield	613,921	5,000	600						
TOTAL	797,300	9,000	1,000						
Ore Hauled to Plant									
Sentinel	456,664	3,719.24	446.31	-	6.86	-	-	-	-
Butterfield 3	66,936	545.15	65.42	-	1.00	-	-	-	-
White Knob	156,400	3,412	341	418.00	6.29	-	-	39.63	-
Sentinel - Butterfield	523,600	4,264	512						
TOTAL	680,000	7,676	853				239.81		
Waste Crusher Fines									
Sentinel	78,775	642	77	-	-	-	-	-	-
Butterfield 3	11,546	94	11	-	-	-	-	-	-
White Knob	26,979	588	59	-	-	-	-	6.84	-
Sentinel - Butterfield	90,321	736	88						
TOTAL	117,300	1,324	147						
Waste Rock Not Processed									
Sentinel	463,514	3,775	453	-	-	-	-	-	-
Butterfield 3	67,940	553	66	-	-	-	-	-	-
White Knob	158,746	3,463	346	-	-	65.14	-	40.22	-
Sentinel - Butterfield	531,454	4,328	519						
TOTAL	690,200	7,791	866						
	1,487,500	tons, total excavated		H	I	J	K	L	M
Total VMT:	not used on this page.			418	14	140	240	87	-
% of VMT:	not used on this page.			23%	1%	8%		5%	0%

	Alternative	Baseline % (
76.1%	67%	50%
23.9%	10%	7%
	23%	42%
	77%	58%

Locaiton	Tons/Year	Tons/Day	Tons/Hour	A - Butterfield Pit	B - Waste Pile	C - West Road	D - Butterfield Crusher	E - Senteniel Pit	F - Crushed Pile	G - Sentinel/ Butterfield to Plant
	Activity Data			Vehicle Miles Traveled per Hour						
Ore to Primary Crusher				4,065	1,800	1,460	-	6,045	-	38,000
Sentinel	535,438	4,361	523	-	-	-	-	15.98	-	-
Butterfield 3	78,483	639	77	1.57		0.57	-	-	-	-
White Knob	183,379	4,000	400	-	-	-	-	-	-	-
Sentinel - Butterfield	613,921	5,000	600							
TOTAL	797,300	9,000	1,000							
Ore Hauled to Plant										
Sentinel	456,664	3,719.24	446.31	-	-	-	-	-	-	85.66
Butterfield 3	66,936	545.15	65.42	-	-	-	-	-	-	12.56
White Knob	156,400	3,412	341	-	-	-	-	-	-	-
Sentinel - Butterfield	523,600	4,264	512							
TOTAL	680,000	7,676	853							
Waste Crusher Fines										
Sentinel	78,775	642	77	-	0.70	0.57	-	-	-	-
Butterfield 3	11,546	94	11	-	0.10	0.08	-	-	-	-
White Knob	26,979	588	59	-	-	-	-	-	-	-
Sentinel - Butterfield	90,321	736	88							
TOTAL	117,300	1,324	147							
Waste Rock Not Processed										
Sentinel	463,514	3,775	453	-	4.12	3.34	-	13.83	-	-
Butterfield 3	67,940	553	66	1.36	0.60	-	-	-	-	-
White Knob	158,746	3,463	346	-	-	-	-	-	-	-
Sentinel - Butterfield	531,454	4,328	519							
TOTAL	690,200	7,791	866							
	1,487,500	tons, total excavated		A	B	C	D	E	F	G
Total VMT:	not used on this page.			2.94	5.52	4.56	-	29.81	-	98.21
% of VMT:	not used on this page.			1%	3%	2%	0%	14%	0%	47%

	Alternative	Baseline % (
76.1%	67%	50%
23.9%	10%	7%
	23%	42%
	77%	58%

Locaiton	Tons/Year	Tons/Day	Tons/Hour	H - White Ridge to Plant	I - Plant Feed	J - White Knob Pit	K - On-Road Trucks	L - Crusher to White Ridge	M - White Ridge Pit	Off-site per Year
	Activity Data			Vehicle Miles Traveled per Hour						Off-site
Ore to Primary Crusher				24,260	365	3,725	6,186	2,300	1,300	
Sentinel	535,438	4,361	523	-	-	-	-	-	-	
Butterfield 3	78,483	639	77	-	-	-	-	-	-	
White Knob	183,379	4,000	400	-	-	7.53	-	-	-	
Sentinel - Butterfield	613,921	5,000	600							
TOTAL	797,300	9,000	1,000							
Ore Hauled to Plant										
Sentinel	456,664	3,719.24	446.31	-	0.82	-	-	-	-	
Butterfield 3	66,936	545.15	65.42	-	0.12	-	-	-	-	
White Knob	156,400	3,412	341	41.80	0.63	-	-	3.96	-	
Sentinel - Butterfield	523,600	4,264	512							
TOTAL	680,000	7,676	853				26.65			3940736
Waste Crusher Fines										
Sentinel	78,775	642	77	-	-	-	-	-	-	
Butterfield 3	11,546	94	11	-	-	-	-	-	-	
White Knob	26,979	588	59	-	-	-	-	0.68	-	
Sentinel - Butterfield	90,321	736	88							
TOTAL	117,300	1,324	147							
Waste Rock Not Processed										
Sentinel	463,514	3,775	453	-	-	-	-	-	-	
Butterfield 3	67,940	553	66	-	-	-	-	-	-	
White Knob	158,746	3,463	346	-	-	6.51	-	4.02	-	
Sentinel - Butterfield	531,454	4,328	519							
TOTAL	690,200	7,791	866							
	1,487,500	tons, total excavated		H	I	J	K	L	M	
Total VMT:	not used on this page.			41.80	1.57	14.04	26.65	8.67	-	
% of VMT:	not used on this page.			20%	1%	7%		4%	0%	

	Alternative	Baseline % (
76.1%	67%	50%
23.9%	10%	7%
	23%	42%
	77%	58%

Baseline

	A			B		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,618.07	15.34	1.84	962.78	11.05	1.33
VMT (%)	1.21%	0.99%	1.05%	0.72%	0.71%	0.76%
TSP - Dust	6,018.41	57.06	6.85	3,581.04	41.09	4.93
PM10 - Dust	1,711.42	16.23	1.95	1,018.32	11.68	1.40
PM2.5 - Dust	171.14	1.62	0.19	101.83	1.17	0.14
TSP - Exhaust	36.22	0.34	0.04	21.55	0.25	0.03
PM10 - Exhaust	36.22	0.34	0.04	21.55	0.25	0.03
PM2.5 - Exhaust	33.32	0.32	0.04	19.83	0.23	0.03
HC	62.81	0.60	0.07	37.37	0.43	0.05
NOx	1,160	11.00	1.32	690	7.92	0.95
CO	757	7.17	0.86	450	5.17	0.62
SOx	0.05	0.00	0.00	0.03	0.00	0.00
CO2	121.05	-	-	72.03	-	-

Project 1.31 scale factor from Project VMT/yr over Baseline VMT/yr

	A			B		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	3,006.10	24.48	2.94	5,652.50	46.04	5.52
VMT (%)	1.72%	1.33%	1.42%	3.23%	2.51%	2.67%
TSP - Dust	11,181.19	91.06	10.93	21,024.45	171.23	20.55
PM10 - Dust	3,179.53	25.90	3.11	5,978.59	48.69	5.84
PM2.5 - Dust	317.95	2.59	0.31	597.86	4.87	0.58
TSP - Exhaust	67.29	0.55	0.07	126.53	1.03	0.12
PM10 - Exhaust	67.29	0.55	0.07	126.53	1.03	0.12
PM2.5 - Exhaust	61.91	0.50	0.06	116.41	0.95	0.11
HC	116.69	0.95	0.11	219.42	1.79	0.21
NOx	2,154.99	17.55	2.11	4,052.12	33.00	3.96
CO	1,405.81	11.45	1.37	2,643.41	21.53	2.58
SOx	0.09	0.00	0.00	0.17	0.00	0.00
CO2 (tons)	224.89	-	-	422.86	-	-

Increment

	A			B		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,388.03	9.14	1.10	4,689.72	34.99	4.20
TSP - Dust	5,162.78	34.00	4.08	17,443.40	130.15	15.62
PM10 - Dust	1,468.11	9.67	1.16	4,960.27	37.01	4.44
PM2.5 - Dust	146.81	0.97	0.12	496.03	3.70	0.44
TSP - Exhaust	31.07	0.20	0.02	104.98	0.78	0.09
PM10 - Exhaust	31.07	0.20	0.02	104.98	0.78	0.09
PM2.5 - Exhaust	28.59	0.19	0.02	96.58	0.72	0.09
HC	53.88	0.35	0.04	182.04	1.36	0.16
NOx	995.04	6.55	0.79	3,361.94	25.08	3.01
CO	649.12	4.27	0.51	2,193.16	16.36	1.96
SOx	0.04	0.00	0.00	0.14	0.00	0.00
CO2 (tons)	103.84	-	-	350.84	-	-

Baseline

	C			D		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,355.33	16.39	1.97	-	-	-
VMT (%)	1.01%	1.05%	1.13%	0.00%	0.00%	0.00%
TSP - Dust	5,041.15	60.95	7.31	-	-	-
PM10 - Dust	1,433.52	17.33	2.08	-	-	-
PM2.5 - Dust	143.35	1.73	0.21	-	-	-
TSP - Exhaust	30.34	0.37	0.04	-	-	-
PM10 - Exhaust	30.34	0.37	0.04	-	-	-
PM2.5 - Exhaust	27.91	0.34	0.04	-	-	-
HC	52.61	0.64	0.08	-	-	-
NOx	972	11.75	1.41	-	-	-
CO	634	7.66	0.92	-	-	-
SOx	0.04	0.00	0.00	-	-	-
CO2	101.39	-	-	-	-	-

Project

	C			D		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	4,662.54	37.97	4.56	-	-	-
VMT (%)	2.66%	2.07%	2.20%	0.00%	0.00%	0.00%
TSP - Dust	17,342.31	141.24	16.95	-	-	-
PM10 - Dust	4,931.53	40.16	4.82	-	-	-
PM2.5 - Dust	493.15	4.02	0.48	-	-	-
TSP - Exhaust	104.37	0.85	0.10	-	-	-
PM10 - Exhaust	104.37	0.85	0.10	-	-	-
PM2.5 - Exhaust	96.02	0.78	0.09	-	-	-
HC	180.99	1.47	0.18	-	-	-
NOx	3,342.45	27.22	3.27	-	-	-
CO	2,180.45	17.76	2.13	-	-	-
SOx	0.14	0.00	0.00	-	-	-
CO2 (tons)	348.80	-	-	-	-	-

Increment

	C			D		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	3,307.21	21.59	2.59	-	-	-
TSP - Dust	12,301.16	80.30	9.64	-	-	-
PM10 - Dust	3,498.01	22.83	2.74	-	-	-
PM2.5 - Dust	349.80	2.28	0.27	-	-	-
TSP - Exhaust	74.03	0.48	0.06	-	-	-
PM10 - Exhaust	74.03	0.48	0.06	-	-	-
PM2.5 - Exhaust	68.11	0.44	0.05	-	-	-
HC	128.38	0.84	0.10	-	-	-
NOx	2,370.85	15.48	1.86	-	-	-
CO	1,546.63	10.10	1.21	-	-	-
SOx	0.10	0.00	0.00	-	-	-
CO2 (tons)	247.41	-	-	-	-	-

Baseline

	E			F		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	8,012.74	93.45	11.21	-	-	-
VMT (%)	6.00%	6.01%	6.42%	0.00%	0.00%	0.00%
TSP - Dust	29,803.34	347.60	41.71	-	-	-
PM10 - Dust	8,475.00	98.85	11.86	-	-	-
PM2.5 - Dust	847.50	9.88	1.19	-	-	-
TSP - Exhaust	179.37	2.09	0.25	-	-	-
PM10 - Exhaust	179.37	2.09	0.25	-	-	-
PM2.5 - Exhaust	165.02	1.92	0.23	-	-	-
HC	311.04	3.63	0.44	-	-	-
NOx	5,744	66.99	8.04	-	-	-
CO	3,747	43.70	5.24	-	-	-
SOx	0.24	0.00	0.00	-	-	-
CO2	599.43	-	-	-	-	-

Project

	E			F		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	30,498.31	248.39	29.81	-	-	-
VMT (%)	17.41%	13.54%	14.39%	0.00%	0.00%	0.00%
TSP - Dust	113,438.33	923.88	110.87	-	-	-
PM10 - Dust	32,257.77	262.72	31.53	-	-	-
PM2.5 - Dust	3,225.78	26.27	3.15	-	-	-
TSP - Exhaust	682.71	5.56	0.67	-	-	-
PM10 - Exhaust	682.71	5.56	0.67	-	-	-
PM2.5 - Exhaust	628.09	5.12	0.61	-	-	-
HC	1,183.88	9.64	1.16	-	-	-
NOx	21,863.41	178.06	21.37	-	-	-
CO	14,262.62	116.16	13.94	-	-	-
SOx	0.91	0.01	0.00	-	-	-
CO2 (tons)	2,281.57	-	-	-	-	-

Increment

	E			F		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	22,485.58	154.94	18.59	-	-	-
TSP - Dust	83,634.99	576.28	69.15	-	-	-
PM10 - Dust	23,782.78	163.87	19.66	-	-	-
PM2.5 - Dust	2,378.28	16.39	1.97	-	-	-
TSP - Exhaust	503.34	3.47	0.42	-	-	-
PM10 - Exhaust	503.34	3.47	0.42	-	-	-
PM2.5 - Exhaust	463.07	3.19	0.38	-	-	-
HC	872.84	6.01	0.72	-	-	-
NOx	16,119.30	111.07	13.33	-	-	-
CO	10,515.44	72.46	8.69	-	-	-
SOx	0.67	0.00	0.00	-	-	-
CO2 (tons)	1,682.14	-	-	-	-	-

Baseline

	G			H		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	72,587.16	815.66	97.88	33,745.62	416.59	41.66
VMT (%)	54.34%	52.46%	56.04%	25.26%	26.79%	23.85%
TSP - Dust	269,987.62	3,033.83	364.06	125,516.67	1,549.49	154.95
PM10 - Dust	76,774.75	862.71	103.53	35,692.42	440.62	44.06
PM2.5 - Dust	7,677.47	86.27	10.35	3,569.24	44.06	4.41
TSP - Exhaust	1,624.87	18.26	2.19	755.40	9.33	0.93
PM10 - Exhaust	1,624.87	18.26	2.19	755.40	9.33	0.93
PM2.5 - Exhaust	1,494.88	16.80	2.02	694.97	8.58	0.86
HC	2,817.67	31.66	3.80	1,309.93	16.17	1.62
NOx	52,036	584.72	70.17	24,191	298.64	29.86
CO	33,946	381.44	45.77	15,781	194.82	19.48
SOx	2.17	0.02	0.00	1.01	0.01	0.00
CO2	5,430.22	-	-	2,524.50	-	-

Project

	G			H		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	100,488.89	818.42	98.21	19,162.95	418.00	41.80
VMT (%)	57.38%	44.61%	47.42%	10.94%	22.78%	20.18%
TSP - Dust	373,767.95	3,044.10	365.29	71,276.50	1,554.74	155.47
PM10 - Dust	106,286.13	865.63	103.88	20,268.47	442.11	44.21
PM2.5 - Dust	10,628.61	86.56	10.39	2,026.85	44.21	4.42
TSP - Exhaust	2,249.45	18.32	2.20	327.21	7.14	0.71
PM10 - Exhaust	2,249.45	18.32	2.20	327.21	7.14	0.71
PM2.5 - Exhaust	2,069.50	16.85	2.02	301.03	6.57	0.66
HC	3,900.76	31.77	3.81	743.86	16.23	1.62
NOx	72,037.76	586.70	70.40	13,737.40	299.65	29.97
CO	46,993.91	382.74	45.93	8,961.61	195.48	19.55
SOx	3.00	0.02	0.00	0.57	0.01	0.00
CO2 (tons)	7,517.54	-	-	1,433.57	-	-

Increment

	G			H		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	27,901.72	2.76	0.33	-14,582.67	1.41	0.14
TSP - Dust	103,780.33	10.27	1.23	-54,240.17	5.25	0.52
PM10 - Dust	29,511.39	2.92	0.35	-15,423.95	1.49	0.15
PM2.5 - Dust	2,951.14	0.29	0.04	-1,542.39	0.15	0.01
TSP - Exhaust	624.58	0.06	0.01	-428.19	-2.19	-0.22
PM10 - Exhaust	624.58	0.06	0.01	-428.19	-2.19	-0.22
PM2.5 - Exhaust	574.62	0.06	0.01	-393.94	-2.01	-0.20
HC	1,083.08	0.11	0.01	-566.07	0.05	0.01
NOx	20,001.99	1.98	0.24	-10,453.92	1.01	0.10
CO	13,048.32	1.29	0.16	-6,819.63	0.66	0.07
SOx	0.83	0.00	0.00	-0.44	0.00	0.00
CO2 (tons)	2,087.32	-	-	-1,090.93	-	-

Baseline

	I			J		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,204.93	14.10	1.57	8,719.27	106.44	10.64
VMT (%)	0.90%	0.91%	0.90%	6.53%	6.85%	6.09%
TSP - Dust	4,481.74	52.45	5.83	32,431.27	395.90	39.59
PM10 - Dust	1,274.45	14.92	1.66	9,222.28	112.58	11.26
PM2.5 - Dust	127.44	1.49	0.17	922.23	11.26	1.13
TSP - Exhaust	26.97	0.32	0.04	195.18	2.38	0.24
PM10 - Exhaust	26.97	0.32	0.04	195.18	2.38	0.24
PM2.5 - Exhaust	24.81	0.29	0.03	179.57	2.19	0.22
HC	46.77	0.55	0.06	338.46	4.13	0.41
NOx	864	10.11	1.12	6,251	76.30	7.63
CO	563	6.59	0.73	4,078	49.78	4.98
SOx	0.04	0.00	0.00	0.26	0.00	0.00
CO2	90.14	-	-	652.29	-	-

Project

	I			J		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,253.54	14.15	1.57	6,436.44	140.40	14.04
VMT (%)	0.72%	0.77%	0.76%	3.68%	7.65%	6.78%
TSP - Dust	4,662.52	52.63	5.85	23,940.32	522.20	52.22
PM10 - Dust	1,325.85	14.97	1.66	6,807.76	148.50	14.85
PM2.5 - Dust	132.59	1.50	0.17	680.78	14.85	1.48
TSP - Exhaust	28.06	0.32	0.04	144.08	3.14	0.31
PM10 - Exhaust	28.06	0.32	0.04	144.08	3.14	0.31
PM2.5 - Exhaust	25.82	0.29	0.03	132.55	2.89	0.29
HC	48.66	0.55	0.06	249.85	5.45	0.54
NOx	898.63	10.14	1.13	4,614.11	100.65	10.06
CO	586.22	6.62	0.74	3,010.02	65.66	6.57
SOx	0.04	0.00	0.00	0.19	0.00	0.00
CO2 (tons)	93.78	-	-	481.51	-	-

Increment

	I			J		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	48.60	0.05	0.01	-2,282.82	33.96	3.40
TSP - Dust	180.78	0.18	0.02	-8,490.95	126.31	12.63
PM10 - Dust	51.41	0.05	0.01	-2,414.52	35.92	3.59
PM2.5 - Dust	5.14	0.01	0.00	-241.45	3.59	0.36
TSP - Exhaust	1.09	0.00	0.00	-51.10	0.76	0.08
PM10 - Exhaust	1.09	0.00	0.00	-51.10	0.76	0.08
PM2.5 - Exhaust	1.00	0.00	0.00	-47.01	0.70	0.07
HC	1.89	0.00	0.00	-88.61	1.32	0.13
NOx	34.84	0.03	0.00	-1,636.49	24.34	2.43
CO	22.73	0.02	0.00	-1,067.57	15.88	1.59
SOx	0.00	0.00	0.00	-0.07	0.00	0.00
CO2 (tons)	3.64	-	-	-170.78	-	-

Baseline

	K			L		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	20,421.14	239.00	26.56	5,383.71	65.72	6.57
VMT (%)	0.00%	0.00%	0.00%	4.03%	4.23%	3.76%
TSP - Dust	751.91	8.80	0.98	20,024.68	244.45	24.44
PM10 - Dust	150.38	1.76	0.20	5,694.30	69.51	6.95
PM2.5 - Dust	36.91	0.43	0.05	569.43	6.95	0.70
TSP - Exhaust	31.80	0.37	0.04	120.51	1.47	0.15
PM10 - Exhaust	31.80	0.37	0.04	120.51	1.47	0.15
PM2.5 - Exhaust	29.25	0.34	0.04	110.87	1.35	0.14
HC	29.32	0.34	0.04	208.98	2.55	0.26
NOx	553.40	6.48	0.72	3,859	47.11	4.71
CO	132.81	1.55	0.17	2,518	30.73	3.07
SOx	0.72	0.01	0.00	0.16	0.00	0.00
CO2	-	-	-	402.75	-	-

Project

	K			L		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	21,244.85	239.81	26.65	3,974.18	86.69	8.67
VMT (%)	0.00%	0.00%	0.00%	2.27%	4.73%	4.19%
TSP - Dust	782.24	8.83	0.98	-	-	-
PM10 - Dust	156.45	1.77	0.20	4,203.45	91.69	9.17
PM2.5 - Dust	38.40	0.43	0.05	420.35	9.17	0.92
TSP - Exhaust	33.08	0.37	0.04	88.96	1.94	0.19
PM10 - Exhaust	33.08	0.37	0.04	88.96	1.94	0.19
PM2.5 - Exhaust	30.43	0.34	0.04	81.85	1.79	0.18
HC	30.50	0.34	0.04	154.27	3.37	0.34
NOx	575.72	6.50	0.72	2,848.98	62.14	6.21
CO	138.17	1.56	0.17	1,858.54	40.54	4.05
SOx	0.75	0.01	0.00	0.12	0.00	0.00
CO2 (tons)	-	-	-	297.31	-	-

Increment

	K			L		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	823.71	0.81	0.09	-1,409.53	20.97	2.10
TSP - Dust	30.33	0.03	0.00	-20,024.68	-244.45	-24.44
PM10 - Dust	6.07	0.01	0.00	-1,490.84	22.18	2.22
PM2.5 - Dust	1.49	0.00	0.00	-149.08	2.22	0.22
TSP - Exhaust	1.28	0.00	0.00	-31.55	0.47	0.05
PM10 - Exhaust	1.28	0.00	0.00	-31.55	0.47	0.05
PM2.5 - Exhaust	1.18	0.00	0.00	-29.03	0.43	0.04
HC	1.18	0.00	0.00	-54.71	0.81	0.08
NOx	22.32	0.02	0.00	-1,010.45	15.03	1.50
CO	5.36	0.01	0.00	-659.17	9.81	0.98
SOx	0.03	0.00	0.00	-0.04	0.00	0.00
CO2 (tons)	-	-	-	-105.45	-	-

Baseline

	M			Total On-site		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	-	-	-	133,589.61	1,554.73	174.67
VMT (%)	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
TSP - Dust	-	-	-	496,885.92	5,782.81	649.67
PM10 - Dust	-	-	-	141,296.45	1,644.42	184.74
PM2.5 - Dust	-	-	-	14,129.64	164.44	18.47
TSP - Exhaust	-	-	-	2,990.42	34.80	3.91
PM10 - Exhaust	-	-	-	2,990.42	34.80	3.91
PM2.5 - Exhaust	-	-	-	2,751.18	32.02	3.60
HC	-	-	-	5,185.65	60.35	6.78
NOx	-	-	-	95,766.76	1,114.54	125.21
CO	-	-	-	62,473.56	727.07	81.68
SOx	-	-	-	3.99	0.05	0.01
CO2	-	-	-	9,994		

Project 1.31

	M			Total On-site		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	-	-	-	175,135.46	1,834.53	207.12
VMT (%)	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
TSP - Dust	-	-	-	636,633.57	6,501.10	738.12
PM10 - Dust	-	-	-	185,239.09	1,940.37	219.07
PM2.5 - Dust	-	-	-	18,523.91	194.04	21.91
TSP - Exhaust	-	-	-	3,818.66	38.85	4.41
PM10 - Exhaust	-	-	-	3,818.66	38.85	4.41
PM2.5 - Exhaust	-	-	-	3,513.17	35.74	4.06
HC	-	-	-	6,798.37	71.21	8.04
NOx	-	-	-	125,549.85	1,315.13	148.48
CO	-	-	-	81,902.59	857.92	96.86
SOx	-	-	-	5.23	0.05	0.01
CO2 (tons)	-	-	-	13,101.83	-	-

Increment

	M			Total On-site		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	-	-	-	41,545.85	279.80	32.45
TSP - Dust	-	-	-	139,747.65	718.28	88.45
PM10 - Dust	-	-	-	43,942.65	295.94	34.32
PM2.5 - Dust	-	-	-	4,394.26	29.59	3.43
TSP - Exhaust	-	-	-	828.25	4.04	0.50
PM10 - Exhaust	-	-	-	828.25	4.04	0.50
PM2.5 - Exhaust	-	-	-	761.99	3.72	0.46
HC	-	-	-	1,612.72	10.86	1.26
NOx	-	-	-	29,783.09	200.58	23.26
CO	-	-	-	19,429.03	130.85	15.17
SOx	-	-	-	1.24	0.01	0.00
CO2 (tons)	-	-	-	3,108.03	-	-

Baseline

	Total Offsite			Total		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	3,787,945.55	3,787,945.55	3,787,945.55	3,921,535.16	3,789,500.28	3,788,120.22
VMT (%)	100.00%	100.00%	100.00%			
TSP - Dust	139,473.29	139,473.29	139,473.29	636,359.21	145,256.10	140,122.96
PM10 - Dust	27,894.66	27,894.66	27,894.66	169,191.10	29,539.08	28,079.40
PM2.5 - Dust	6,846.87	6,846.87	6,846.87	20,976.52	7,011.31	6,865.35
TSP - Exhaust	5,898.06	5,898.06	5,898.06	8,888.47	5,932.86	5,901.97
PM10 - Exhaust	5,898.06	5,898.06	5,898.06	8,888.47	5,932.86	5,901.97
PM2.5 - Exhaust	5,426.21	5,426.21	5,426.21	8,177.40	5,458.23	5,429.81
HC	5,437.75	5,437.75	5,437.75	10,623.40	5,498.10	5,444.53
NOx	102,650.55	102,650.55	102,650.55	198,417.31	103,765.10	102,775.77
CO	24,635.25	24,635.25	24,635.25	87,108.81	25,362.33	24,716.94
SOx	133.92	133.92	133.92	137.90	133.96	133.92
CO2	7,067.22	7,067.22	7,067.22	17,061.02	7,067.22	7,067.22

Project

	Total Offsite			Total		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	3,940,736.00	-	-	4,115,871.46	1,834.53	207.12
VMT (%)	100.00%	100.00%	100.00%			
TSP - Dust	145,099.08	-	-	781,732.65	6,501.10	738.12
PM10 - Dust	29,019.82	-	-	214,258.91	1,940.37	219.07
PM2.5 - Dust	7,123.05	-	-	25,646.95	194.04	21.91
TSP - Exhaust	6,135.96	-	-	9,954.63	38.85	4.41
PM10 - Exhaust	6,135.96	-	-	9,954.63	38.85	4.41
PM2.5 - Exhaust	5,645.08	-	-	9,158.26	35.74	4.06
HC	5,657.09	-	-	12,455.46	71.21	8.04
NOx	106,791.06	-	-	232,340.91	1,315.13	148.48
CO	25,628.94	-	-	107,531.53	857.92	96.86
SOx	139.32	-	-	144.54	0.05	0.01
CO2 (tons)	7,339.35	-	-	20,441.18	-	-

Increment

	Total Offsite			Total		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	152,790.45	-3,787,945.55	-3,787,945.55	194,336.30	-3,787,665.75	-3,787,913.10
TSP - Dust	5,625.79	-139,473.29	-139,473.29	145,373.44	-138,755.01	-139,384.84
PM10 - Dust	1,125.16	-27,894.66	-27,894.66	45,067.80	-27,598.72	-27,860.34
PM2.5 - Dust	276.18	-6,846.87	-6,846.87	4,670.44	-6,817.28	-6,843.44
TSP - Exhaust	237.90	-5,898.06	-5,898.06	1,066.15	-5,894.01	-5,897.55
PM10 - Exhaust	237.90	-5,898.06	-5,898.06	1,066.15	-5,894.01	-5,897.55
PM2.5 - Exhaust	218.87	-5,426.21	-5,426.21	980.86	-5,422.49	-5,425.75
HC	219.34	-5,437.75	-5,437.75	1,832.06	-5,426.89	-5,436.49
NOx	4,140.51	-102,650.55	-102,650.55	33,923.60	-102,449.97	-102,627.29
CO	993.69	-24,635.25	-24,635.25	20,422.72	-24,504.40	-24,620.08
SOx	5.40	-133.92	-133.92	6.64	-133.91	-133.92
CO2 (tons)	272.13	-7,067.22	-7,067.22	3,380.17	-7,067.22	-7,067.22

	VOL1	VOL2	VOL3	VOL4	VOL5	VOL6	VOL7	VOL8	VOL9	VOL10
altTSPann	-3.50E-01	-8.14E-01	0.00E+00	-3.00E-01	-3.00E-01	1.14E-01	2.60E-01	4.97E-03	2.06E-01	7.84E-01
altTSPday	-1.28E+00	-2.97E+00	0.00E+00	-1.09E+00	-1.09E+00	4.15E-01	9.50E-01	1.81E-02	7.52E-01	2.86E+00
altPM10ann	-1.17E-01	-4.10E-01	0.00E+00	-1.48E-01	-1.48E-01	2.10E-02	1.31E-01	2.59E-03	3.90E-02	3.95E-01
altPM10day	-4.29E-01	-1.50E+00	0.00E+00	-5.40E-01	-5.40E-01	7.66E-02	4.77E-01	9.47E-03	1.42E-01	1.44E+00
altPM25ann	-4.03E-02	-1.27E-01	0.00E+00	-5.23E-02	-5.23E-02	5.06E-03	3.03E-02	1.03E-03	1.45E-02	9.38E-02
altPM25day	-1.47E-01	-4.62E-01	0.00E+00	-1.91E-01	-1.91E-01	1.85E-02	1.11E-01	3.76E-03	5.31E-02	3.42E-01
TSPann (lb/yr/src)	-24344.2	-56602.5	0	-20836.8	-20836.8	7899.8	18102.1	345.62535	14331.7	54510.2
TSPday (lb/day/src)	-243.442	-566.025	0	-208.368	-208.368	78.998	181.021	3.4562535	143.317	545.102
PM10ann (lb/yr/src	-8167.11	-28507.7	0	-10281.8	-10281.8	1459.44	9077.02	180.3284	2714.3	27434.8
PM10day (lb/day/s	-81.6711	-285.077	0	-102.818	-102.818	14.5944	90.7702	1.803284	27.143	274.348
PM25ann (lb/yr/src	-2803.9	-8798.71	0	-3636.89	-3636.89	351.818	2104.94	71.580398	1011.45	6518.57
PM25day (lb/day/s	-28.039	-87.9871	0	-36.3689	-36.3689	3.51818	21.0494	0.715804	10.1145	65.1857
TSPann (lb/yr)	-24,344	-56,602	0	-20,837	-20,837	7,900	18,102	346	14,332	54,510
TSPday (lb/day)	-243	-566	0	-208	-208	79	181	3	143	545
PM10ann (lb/yr)	-8,167	-28,508	0	-10,282	-10,282	1,459	9,077	180	2,714	27,435
PM10day (lb/day)	-82	-285	0	-103	-103	15	91	2	27	274
PM25ann (lb/yr)	-2,804	-8,799	0	-3,637	-3,637	352	2,105	72	1,011	6,519
PM25day (lb/day)	-28	-88	0	-36	-36	4	21	1	10	65
HC (lb/yr)	-640	-554	0	-16	-16	23	74	37	234	562
NOx (lb/yr)	-9,898	-8,146	0	-240	-240	174	1,097	539	5,164	8,263
CO (lb/yr)	-14,201	-5,306	0	-156	-156	112	516	351	5,533	5,382
SOx (lb/yr)	-0.305	-0.292	0	-0.009	-0.009	0.006	0.032	0.019	0.552	0.296
CO2 (ton/yr)	-584	-769	0	-23	-23	25	85	51	593	780
TSP (lb/yr)	-24,344	-56,602	0	-20,837	-20,837	7,900	18,102	346	14,332	54,510
PM10 (lb/yr)	-8,167	-28,508	0	-10,282	-10,282	1,459	9,077	180	2,714	27,435
PM2.5 (lb/yr)	-2,804	-8,799	0	-3,637	-3,637	352	2,105	72	1,011	6,519

	A	B	C	E0	G	H	I	J	K	L	M
altTSPann	1.97E-03	1.48E-02	1.27E-02	2.24E-02	4.59E-03	-3.85E-03	6.54E-04	-3.41E-03	5.68E-06	-1.44E-02	0.00E+00
altTSPday	4.73E-03	4.04E-02	3.03E-02	5.64E-02	1.66E-04	7.87E-05	2.35E-04	1.85E-02	2.04E-06	-6.40E-02	0.00E+00
altPM10ann	5.67E-04	4.29E-03	3.67E-03	6.47E-03	1.33E-03	-1.12E-03	1.89E-04	-9.85E-04	1.32E-06	-1.09E-03	0.00E+00
altPM10day	1.36E-03	1.17E-02	8.74E-03	1.63E-02	4.79E-05	-1.79E-05	6.77E-05	5.35E-03	4.74E-07	5.94E-03	0.00E+00
altPM25ann	6.64E-05	5.01E-04	4.29E-04	7.57E-04	1.55E-04	-1.37E-04	2.21E-05	-1.15E-04	4.80E-07	-1.28E-04	0.00E+00
altPM25day	1.60E-04	1.37E-03	1.02E-03	1.90E-03	5.60E-06	-4.80E-05	7.92E-06	6.26E-04	1.72E-07	6.95E-04	0.00E+00
TSPann (lb/yr/src)	136.6803	1032.26	883.942	1558.12	319.281	-267.982	45.4659	-237.279	0.39515	-1002.81	0
TSPday (lb/day/src)	0.900105	7.70169	5.77	10.7361	0.03161	0.014996	0.04467	3.52967	0.00039	-12.1988	0
PM10ann (lb/yr/src	39.45211	297.956	255.146	449.743	92.1589	-77.7066	13.1235	-68.4895	0.09185	-76.1198	0
PM10day (lb/day/s	0.259811	2.22306	1.66548	3.09892	0.00912	-0.00341	0.0129	1.01882	9E-05	1.13233	0
PM25ann (lb/yr/src	4.615696	34.8594	29.8507	52.6176	10.7821	-9.49183	1.53538	-8.01292	0.03336	-8.90563	0
PM25day (lb/day/s	0.030397	0.26009	0.19485	0.36256	0.00107	-0.00914	0.00151	0.1192	3.3E-05	0.13248	0
TSPann (lb/yr)	5,194	17,548	12,375	84,138	104,405	-54,668	182	-8,542	32	-20,056	0
TSPday (lb/day)	34	131	81	580	10	3	0	127	0.031	-244	0
PM10ann (lb/yr)	1,499	5,065	3,572	24,286	30,136	-15,852	52	-2,466	7	-1,522	0
PM10day (lb/day)	10	38	23	167	3	-1	0	37	0	23	0
PM25ann (lb/yr)	175	593	418	2,841	3,526	-1,936	6	-288	3	-178	0
PM25day (lb/day)	1	4	3	20	0	-2	0	4	0	3	0
HC (lb/yr)	54	182	128	873	1,083	-566	2	-89	1	-55	0
NOx (lb/yr)	995	3,362	2,371	16,119	20,002	-10,454	35	-1,636	22	-1,010	0
CO (lb/yr)	649	2,193	1,547	10,515	13,048	-6,820	23	-1,068	5	-659	0
SOx (lb/yr)	0.041	0.140	0.099	0.671	0.833	-0.435	0.001	-0.068	0.029	-0.042	0
CO2 (ton/yr)	104	351	247	1,682	2,087	-1,091	4	-171	0	-105	0
TSP (lb/yr)	5,194	17,548	12,375	84,138	104,405	-54,668	182	-8,542	32	-20,056	0
PM10 (lb/yr)	1,499	5,065	3,572	24,286	30,136	-15,852	52	-2,466	7	-1,522	0
PM2.5 (lb/yr)	175	593	418	2,841	3,526	-1,936	6	-288	3	-178	0

	Total Sentinel Butterfield	Total White Knob	Total Processing Plant	Total Offsite
altTSPann				
altTSPday				
altPM10ann				
altPM10day				
altPM25ann				
altPM25day				
TSPann (lb/yr/src)				
TSPday (lb/day/src)				
PM10ann (lb/yr/src				
PM10day (lb/day/s				
PM25ann (lb/yr/src				
PM25day (lb/day/s				
TSPann (lb/yr)	310,950	-205,887	8,082	
TSPday (lb/day)	1,709	-1,340	79	
PM10ann (lb/yr)	103,965	-77,079	1,512	
PM10day (lb/day)	635	-514	15	
PM25ann (lb/yr)	17,260	-21,279	358	
PM25day (lb/day)	125	-184	4	
HC (lb/yr)	3,227	-1,937	25	219.3
NOx (lb/yr)	57,912	-31,624	209	4140.5
CO (lb/yr)	39,735	-28,365	134	993.7
SOx (lb/yr)	3	-1	0	5.4
CO2 (ton/yr)	5,980	-2,765	28	272.1
TSP (lb/yr)	310,950	-205,887	8,082	5863.7
PM10 (lb/yr)	103,965	-77,079	1,512	1363.1
PM2.5 (lb/yr)	17,260	-21,279	358	495.0

	Total Project w/o White Knob	Total Project w/ White Knob
altTSPann		
altTSPday		
altPM10ann		
altPM10day		
altPM25ann		
altPM25day		
TSPann (lb/yr/src)		
TSPday (lb/day/src)		
PM10ann (lb/yr/src		
PM10day (lb/day/s		
PM25ann (lb/yr/src		
PM25day (lb/day/s		
TSPann (lb/yr)	319,032	113,145
TSPday (lb/day)	1,788	448
PM10ann (lb/yr)	105,477	28,398
PM10day (lb/day)	650	136
PM25ann (lb/yr)	17,618	-3,662
PM25day (lb/day)	129	-55
HC (lb/yr)	3,252	1,316
NOx (lb/yr)	58,121	26,497
CO (lb/yr)	39,869	11,504
SOx (lb/yr)	3	2
CO2 (ton/yr)	6,008	3,243
TSP (lb/yr)	319,032	113,145
PM10 (lb/yr)	105,477	28,398
PM2.5 (lb/yr)	17,618	-3,662

Volume Source Identifiers

```
  LOCATION VOL1     VOLUME   498771.228  3802380.117     0
** DESCRSRC White Knob Crushing
  LOCATION VOL2     VOLUME   498410.694  3802532.330     0
** DESCRSRC White Knob Pit
  LOCATION VOL3     VOLUME   499367.635  3802416.274     0
** DESCRSRC White Ridge Pit
  LOCATION VOL4     VOLUME   499169.967  3802653.553     0
** DESCRSRC OB1
  LOCATION VOL5     VOLUME   498786.819  3802108.559     0
** DESCRSRC OB2
  LOCATION VOL6     VOLUME   505294.247  3804607.151     0
** DESCRSRC Processing Plant
  LOCATION VOL7     VOLUME   504322.000  3798695.000     0
** DESCRSRC Butterfield Pit
  LOCATION VOL8     VOLUME   505430.000  3797960.000     0
** DESCRSRC B5 Pad Expansion
  LOCATION VOL9     VOLUME   505555.000  3798545.000     0
** DESCRSRC Butterfield-Sentinel Crushing
  LOCATION VOL10    VOLUME   505808.000  3798770.000     (
** DESCRSRC Sentinel Pit
```

	ID	# of sources	ID	# of sources	ID	# of sources	ID	# of sources
	A	38	B	17	C	14	E0	54
CHEMICAL	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)
arsenic	0.00058	2.0933E-06	0.004377	3.92963E-06	0.003748	2.94402E-06	0.006606	5.47787E-06
bromine	0.000695	3.82022E-06	0.005252	4.7244E-06	0.004497	3.53945E-06	0.007928	6.58577E-06
cadmium	0.000502	2.49268E-05	0.003793	3.56196E-06	0.003248	2.66857E-06	0.005725	4.96534E-06
chlorine	0.032607	5.11159E-05	0.246263	0.000220656	0.21088	0.000165312	0.371716	0.000307593
copper	0.006104	5.55191E-05	0.046101	4.16184E-05	0.039478	3.11799E-05	0.069587	5.80157E-05
lead	0.005022	1.21457E-05	0.037932	3.40162E-05	0.032481	2.54845E-05	0.057255	4.74183E-05
manganese	0.035351	7.53605E-05	0.26698	0.000239353	0.22862	0.00017932	0.402986	0.000333657
mercury	0.000541	6.15109E-06	0.004085	3.69603E-06	0.003498	2.76901E-06	0.006166	5.15224E-06
nickel	0.001429	8.48863E-06	0.010796	9.71556E-06	0.009245	7.27876E-06	0.016296	1.35434E-05
selenium	0.000116	6.63291E-06	0.000875	8.27944E-07	0.00075	6.20284E-07	0.001321	1.15415E-06
vanadium (fume or dust)	0.002975	3.16856E-06	0.022467	2.01208E-05	0.019239	1.50742E-05	0.033912	2.80483E-05
Silica, Crystln	1.545378	0.001221246	11.67124	0.010449513	9.994305	0.007828625	17.61687	0.014566538
Asbestos	0	0	0	0	0	0	0	0
1,3-butadiene	0	2.12897E-06	0	1.82164E-05	0	1.36474E-05	0	2.53935E-05
acetaldehyde	0	8.23574E-05	0	0.000704686	0	0.000527941	0	0.000982327
benzene	0	2.24102E-05	0	0.000191751	0	0.000143657	0	0.0002673
ethyl benzene	0	3.47358E-06	0	2.97215E-05	0	2.22669E-05	0	4.14315E-05
formaldehyde	0	0.000164827	0	0.001410331	0	0.0010566	0	0.00196599
hexane	0	1.79281E-06	0	1.53401E-05	0	1.14926E-05	0	2.1384E-05
methanol	0	3.36153E-07	0	2.87627E-06	0	2.15486E-06	0	4.0095E-06
methyl ethyl ketone {2-butanone	0	1.65835E-05	0	0.000141896	0	0.000106306	0	0.000197802
m-xylene	0	6.8351E-06	0	5.84841E-05	0	4.38155E-05	0	8.15264E-05
naphthalene	0	1.00846E-06	0	8.62881E-06	0	6.46458E-06	0	1.20285E-05
o-xylene	0	3.80973E-06	0	3.25977E-05	0	2.44217E-05	0	4.5441E-05
propylene	0	2.91332E-05	0	0.000249277	0	0.000186755	0	0.00034749
p-xylene	0	1.12051E-06	0	9.58756E-06	0	7.18287E-06	0	1.3365E-05
styrene	0	6.72305E-07	0	5.75254E-06	0	4.30972E-06	0	8.01899E-06
toluene	0	1.64715E-05	0	0.000140937	0	0.000105588	0	0.000196465
DieselExhPM	0.817664	0	6.175289	0	5.288019	0	9.321145	0

	ID	# of sources	ID	# of sources	ID	# of sources	ID	# of sources
	G	327	H	204	I	4	J	36
CHEMICAL	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)
arsenic	0.001353733	1.61271E-08	-0.00113	8.82633E-09	0.000193	2.11058E-08	-0.00101	1.50078E-06
bromine	0.00162448	1.93888E-08	-0.00136	8.87546E-09	0.000231	2.53745E-08	-0.00121	1.80432E-06
cadmium	0.001173236	1.46182E-08	-0.00098	-2.26689E-08	0.000167	1.91311E-08	-0.00087	1.36037E-06
chlorine	0.076170059	9.05569E-07	-0.06381	5.8408E-07	0.010847	1.18513E-06	-0.05661	8.42719E-05
copper	0.014259324	1.70801E-07	-0.01195	4.90662E-08	0.002031	2.2353E-07	-0.0106	1.58947E-05
lead	0.011732355	1.39602E-07	-0.00983	8.43605E-08	0.001671	1.82699E-07	-0.00872	1.29913E-05
manganese	0.08257773	9.82301E-07	-0.06918	6.07052E-07	0.011759	1.28555E-06	-0.06137	9.14127E-05
mercury	0.001263484	1.51684E-08	-0.00106	2.73197E-09	0.00018	1.98512E-08	-0.00094	1.41157E-06
nickel	0.003339209	3.98725E-08	-0.0028	1.74098E-08	0.000476	5.21818E-08	-0.00248	3.71052E-06
selenium	0.000270747	3.39787E-09	-0.00023	-6.38638E-09	3.86E-05	4.44685E-09	-0.0002	3.16205E-07
vanadium (fume or dust)	0.006949164	8.25755E-08	-0.00582	5.52478E-08	0.00099	1.08068E-07	-0.00516	7.68446E-06
Silica, Crystln	3.609955422	4.28846E-05	-3.0243	2.92573E-05	0.51406	5.61238E-05	-2.6828	0.003990828
Asbestos	0	0	0	0	0	0	0	0
1,3-butadiene	0	7.47596E-08	0	5.10036E-08	0	9.78392E-08	0	6.95711E-06
acetaldehyde	0	2.89202E-06	0	1.97303E-06	0	3.78483E-06	0	0.00026913
benzene	0	7.86944E-07	0	5.3688E-07	0	1.02989E-06	0	7.32327E-05
ethyl benzene	0	1.21976E-07	0	8.32164E-08	0	1.59632E-07	0	1.13511E-05
formaldehyde	0	5.78797E-06	0	3.94875E-06	0	7.57482E-06	0	0.000538627
hexane	0	6.29555E-08	0	4.29504E-08	0	8.23909E-08	0	5.85862E-06
methanol	0	1.18042E-08	0	8.0532E-09	0	1.54483E-08	0	1.09849E-06
methyl ethyl ketone {2-butanone	0	5.82338E-07	0	3.97291E-07	0	7.62116E-07	0	5.41922E-05
m-xylene	0	2.40018E-07	0	1.63748E-07	0	3.14115E-07	0	2.2336E-05
naphthalene	0	3.54125E-08	0	2.41596E-08	0	4.63449E-08	0	3.29547E-06
o-xylene	0	1.3378E-07	0	9.12696E-08	0	1.75081E-07	0	1.24496E-05
propylene	0	1.02303E-06	0	6.97944E-07	0	1.33885E-06	0	9.52026E-05
p-xylene	0	3.93472E-08	0	2.6844E-08	0	5.14943E-08	0	3.66164E-06
styrene	0	2.36083E-08	0	1.61064E-08	0	3.08966E-08	0	2.19698E-06
toluene	0	5.78404E-07	0	3.94607E-07	0	7.56967E-07	0	5.38261E-05
DieselExhPM	1.910039205	0	-2.09899	0	0.271991	0	-1.41948	0

	ID	# of sources	ID	# of sources	ID	# of sources	ID	# of sources	ID	# of sources
	K	80	L	20	M	12	VOL1	1	VOL2	1
CHEMICAL	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)
arsenic	2.93341E-05	1.27673E-10	-0.00112	1.66799E-06	0	0	-0.6271584	-0.001046	-2.251914	-0.003754
bromine	3.52009E-05	1.56008E-10	-0.00134	2.00534E-06	0	0	-0.391974	-0.000655	-1.407446	-0.002348
cadmium	2.54229E-05	1.60126E-10	-0.00097	1.51192E-06	0	0	-0.6271584	-0.001062	-2.251914	-0.003771
chlorine	0.00165053	7.04101E-09	-0.06291	9.36606E-05	0	0	-140.091507	-0.233503	-503.0212	-0.838387
copper	0.000308985	1.41647E-09	-0.01178	1.76655E-05	0	0	-5.56603079	-0.009311	-19.98573	-0.033347
lead	0.000254229	1.09366E-09	-0.00969	1.44387E-05	0	0	-13.5623004	-0.022609	-48.69763	-0.081169
manganese	0.001789378	7.67602E-09	-0.06821	0.000101597	0	0	-5.09566199	-0.008524	-18.2968	-0.030529
mercury	2.73785E-05	1.28146E-10	-0.00104	1.56883E-06	0	0	-0.0783948	-0.000134	-0.281489	-0.000473
nickel	7.23574E-05	3.22044E-10	-0.00276	4.12391E-06	0	0	-2.2734492	-0.003794	-8.163187	-0.013611
selenium	5.86681E-06	3.88371E-11	-0.00022	3.51433E-07	0	0	-4.39010879	-0.007321	-15.76339	-0.026277
vanadium (fume or dust)	0.000150582	6.39167E-10	-0.00574	8.54058E-06	0	0	-0.1567896	-0.000262	-0.562978	-0.000939
Silica, Crystln	0.078224169	3.31126E-07	-2.98169	0.004435444	0	0	-313.5792	-0.522632	-1125.957	-1.876595
Asbestos	0	0	0	0	0	0	0	0	0	0
1,3-butadiene	0	2.75948E-08	0	7.7322E-06	0	0	0	-0.002027	0	-0.001755
acetaldehyde	0	1.06748E-06	0	0.000299114	0	0	0	-0.078431	0	-0.067908
benzene	0	2.90472E-07	0	8.13916E-05	0	0	0	-0.021342	0	-0.018478
ethyl benzene	0	4.50231E-08	0	1.26157E-05	0	0	0	-0.003308	0	-0.002864
formaldehyde	0	2.13642E-06	0	0.000598635	0	0	0	-0.156968	0	-0.135909
hexane	0	2.32377E-08	0	6.51132E-06	0	0	0	-0.001707	0	-0.001478
methanol	0	4.35708E-09	0	1.22087E-06	0	0	0	-0.00032	0	-0.000277
methyl ethyl ketone {2-butanone	0	2.14949E-07	0	6.02298E-05	0	0	0	-0.015793	0	-0.013674
m-xylene	0	8.85939E-08	0	2.48244E-05	0	0	0	-0.006509	0	-0.005636
naphthalene	0	1.30712E-08	0	3.66262E-06	0	0	0	-0.00096	0	-0.000832
o-xylene	0	4.93802E-08	0	1.38366E-05	0	0	0	-0.003628	0	-0.003141
propylene	0	3.77613E-07	0	0.000105809	0	0	0	-0.027744	0	-0.024022
p-xylene	0	1.45236E-08	0	4.06958E-06	0	0	0	-0.001067	0	-0.000924
styrene	0	8.71415E-09	0	2.44175E-06	0	0	0	-0.00064	0	-0.000554
toluene	0	2.13497E-07	0	5.98228E-05	0	0	0	-0.015686	0	-0.013582
DieselExhPM	0.016032001	0	-1.57762	0	0	0	-327.633166	0	-358.7551	0

	ID	# of sources	ID	# of sources	ID	# of sources	ID	# of sources
	VOL3	1	VOL4	1	VOL5	1	VOL6	1
CHEMICAL	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)
arsenic	0	0	-0.821704	-0.001370304	-0.821704	-0.001369541	0.115476	0.000192513
bromine	0	0	-0.513565	-0.000857538	-0.513565	-0.000856011	0.072172	0.000120394
cadmium	0	0	-0.821704	-0.001381485	-0.821704	-0.001370033	0.115476	0.000193259
chlorine	0	0	-183.548	-0.305925746	-183.548	-0.305913912	25.7944	0.042991501
copper	0	0	-7.292619	-0.012179122	-7.292619	-0.012155455	1.024848	0.001709732
lead	0	0	-17.76934	-0.029619557	-17.76934	-0.02961574	2.497164	0.004162207
manganese	0	0	-6.676341	-0.011150395	-6.676341	-0.011128255	0.938241	0.001565281
mercury	0	0	-0.102713	-0.000173983	-0.102713	-0.000171311	0.014434	2.4244E-05
nickel	0	0	-2.978675	-0.004968053	-2.978675	-0.004964617	0.4186	0.000697906
selenium	0	0	-5.751925	-0.009589735	-5.751925	-0.009586682	0.808331	0.001347431
vanadium (fume or dust)	0	0	-0.205426	-0.000342776	-0.205426	-0.000342394	0.028869	4.81416E-05
Silica, Crystln	0	0	-410.8518	-0.68475292	-410.8518	-0.68475292	57.7379	0.096229826
Asbestos	0	0	0	0	0	0	0	0
1,3-butadiene	0	0	0	-5.1631E-05	0	-5.1631E-05	0	7.38573E-05
acetaldehyde	0	0	0	-0.001997304	0	-0.001997304	0	0.002857111
benzene	0	0	0	-0.000543484	0	-0.000543484	0	0.000777445
ethyl benzene	0	0	0	-8.424E-05	0	-8.424E-05	0	0.000120504
formaldehyde	0	0	0	-0.003997326	0	-0.003997326	0	0.00571811
hexane	0	0	0	-4.34787E-05	0	-4.34787E-05	0	6.21956E-05
methanol	0	0	0	-8.15226E-06	0	-8.15226E-06	0	1.16617E-05
methyl ethyl ketone {2-butanone	0	0	0	-0.000402178	0	-0.000402178	0	0.00057531
m-xylene	0	0	0	-0.000165763	0	-0.000165763	0	0.000237121
naphthalene	0	0	0	-2.44568E-05	0	-2.44568E-05	0	3.4985E-05
o-xylene	0	0	0	-9.23923E-05	0	-9.23923E-05	0	0.000132166
propylene	0	0	0	-0.000706529	0	-0.000706529	0	0.001010679
p-xylene	0	0	0	-2.71742E-05	0	-2.71742E-05	0	3.88723E-05
styrene	0	0	0	-1.63045E-05	0	-1.63045E-05	0	2.33234E-05
toluene	0	0	0	-0.000399461	0	-0.000399461	0	0.000571422
DieselExhPM	0	0	-10.55162	0	-10.55162	0	15.99162	0

	ID	# of sources	ID	# of sources	ID	# of sources	ID	# of sources
	VOL7	1	VOL8	1	VOL9	1	VOL10	1
CHEMICAL	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)
arsenic	0.721891	0.001203329	0.012528	2.09587E-05	0.202202	0.000337626	2.165672	0.003610666
bromine	0.451182	0.000752325	0.00783	1.3208E-05	0.126376	0.000211872	1.353545	0.002258334
cadmium	0.721891	0.00120582	0.012528	2.20662E-05	0.202202	0.000346342	2.165672	0.003627648
chlorine	161.2523	0.268756609	2.79839	0.00466521	45.16687	0.07528776	483.7569	0.806280353
copper	6.406779	0.010683482	0.111184	0.000187759	1.794543	0.003010204	19.22034	0.032071498
lead	15.61088	0.02601903	0.270913	0.000451917	4.372618	0.007290809	46.83265	0.078060485
manganese	5.865361	0.009780762	0.101788	0.000171941	1.642891	0.002756206	17.59608	0.029361982
mercury	0.090236	0.000151017	0.001566	2.88682E-06	0.025275	4.43044E-05	0.270709	0.000455427
nickel	2.616853	0.004362223	0.045413	7.60446E-05	0.732982	0.001224439	7.85056	0.013089725
selenium	5.053234	0.008422769	0.087694	0.000146474	1.415414	0.002361513	15.1597	0.025271023
vanadium (fume or dust)	0.180473	0.000300877	0.003132	5.25946E-06	0.05055	8.45621E-05	0.541418	0.00090297
Silica, Crystln	360.9453	0.601575491	6.263885	0.010439808	101.101	0.168501645	1082.836	1.804726472
Asbestos	0	0	0	0	0	0	0	0
1,3-butadiene	0	0.000234075	0	0.000116121	0	0.000740611	0	0.001780621
acetaldehyde	0	0.009055004	0	0.004492066	0	0.028649961	0	0.06888191
benzene	0	0.002463947	0	0.001222331	0	0.007795908	0	0.018743377
ethyl benzene	0	0.000381912	0	0.000189461	0	0.001208366	0	0.002905223
formaldehyde	0	0.018122327	0	0.008990244	0	0.057338901	0	0.137857537
hexane	0	0.000197116	0	9.77865E-05	0	0.000623673	0	0.00149947
methanol	0	3.69592E-05	0	1.8335E-05	0	0.000116939	0	0.000281151
methyl ethyl ketone {2-butanone	0	0.00182332	0	0.000904525	0	0.005768972	0	0.013870099
m-xylene	0	0.000751504	0	0.000372811	0	0.002377752	0	0.00571673
naphthalene	0	0.000110878	0	5.50049E-05	0	0.000350816	0	0.000843452
o-xylene	0	0.000418871	0	0.000207796	0	0.001325304	0	0.003186374
propylene	0	0.003203131	0	0.00158903	0	0.01013468	0	0.02436639
p-xylene	0	0.000123197	0	6.11165E-05	0	0.000389795	0	0.000937169
styrene	0	7.39184E-05	0	3.66699E-05	0	0.000233877	0	0.000562301
toluene	0	0.001811001	0	0.000898413	0	0.005729992	0	0.013776382
DieselExhPM	53.38591	0	23.73128	0	186.7733	0	363.8984	0

	Total Sentinel Butterfield	Total White Knob	Total Processing Plant	Total Project w/o White Knob Reductions	Total Project w/ White Knob Reductions
HC	1.61	-0.97	0.01	1.63	0.66
NOx	29.0	-15.8	0.10	29.06	13.2
CO	19.9	-14.2	0.07	19.93	5.8
SOx	0.0013	-0.0006	0.0000	0.0013	0.0008
TSP	102	-112	3.57	105.37	-7
PM10	36.7	-41.7	0.62	37.34	-4.3
PM2.5	7.1	-11.0	0.17	7.27	-3.7
CO2	5,980	-2,765	28.3	6,008.02	3,243

Baseline

	A			B		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,618.07	15.34	1.84	962.78	11.05	1.33
VMT (%)	1.21%	0.99%	1.05%	0.72%	0.71%	0.76%
TSP - Dust	6,018.41	57.06	6.85	3,581.04	41.09	4.93
PM10 - Dust	1,711.42	16.23	1.95	1,018.32	11.68	1.40
PM2.5 - Dust	171.14	1.62	0.19	101.83	1.17	0.14
TSP - Exhaust	36.22	0.34	0.04	21.55	0.25	0.03
PM10 - Exhaust	36.22	0.34	0.04	21.55	0.25	0.03
PM2.5 - Exhaust	33.32	0.32	0.04	19.83	0.23	0.03
HC	62.81	0.60	0.07	37.37	0.43	0.05
NOx	1,160	11.00	1.32	690	7.92	0.95
CO	757	7.17	0.86	450	5.17	0.62
SOx	0.05	0.00	0.00	0.03	0.00	0.00
CO2	121.05	-	-	72.03	-	-

Project 1.31 scale factor from Project VMT/yr over Baseline VMT/yr

	A			B		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	3,006.10	24.48	2.94	5,652.50	46.04	5.52
VMT (%)	1.72%	1.33%	1.42%	3.23%	2.51%	2.67%
TSP - Dust	8,944.95	72.85	8.74	16,819.56	136.98	16.44
PM10 - Dust	2,543.62	20.72	2.49	4,782.88	38.95	4.67
PM2.5 - Dust	254.36	2.07	0.25	478.29	3.90	0.47
TSP - Exhaust	67.29	0.55	0.07	126.53	1.03	0.12
PM10 - Exhaust	67.29	0.55	0.07	126.53	1.03	0.12
PM2.5 - Exhaust	61.91	0.50	0.06	116.41	0.95	0.11
HC	116.69	0.95	0.11	219.42	1.79	0.21
NOx	2,154.99	17.55	2.11	4,052.12	33.00	3.96
CO	1,405.81	11.45	1.37	2,643.41	0.85	0.10
SOx	0.09	0.00	0.00	0.17	0.00	0.00
CO2 (tons)	224.89	-	-	422.86	-	-

Increment

	A			B		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,388.03	9.14	1.10	4,689.72	34.99	4.20
TSP - Dust	2,926.54	15.79	1.89	13,238.51	95.90	11.51
PM10 - Dust	832.20	4.49	0.54	3,764.56	27.27	3.27
PM2.5 - Dust	83.22	0.45	0.05	376.46	2.73	0.33
TSP - Exhaust	31.07	0.20	0.02	104.98	0.78	0.09
PM10 - Exhaust	31.07	0.20	0.02	104.98	0.78	0.09
PM2.5 - Exhaust	28.59	0.19	0.02	96.58	0.72	0.09
HC	53.88	0.35	0.04	182.04	1.36	0.16
NOx	995.04	6.55	0.79	3,361.94	25.08	3.01
CO	649.12	4.27	0.51	2,193.16	-4.31	-0.52
SOx	0.04	0.00	0.00	0.14	0.00	0.00
CO2 (tons)	103.84	-	-	350.84	-	-

Baseline

	C			D		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,355.33	16.39	1.97	-	-	-
VMT (%)	1.01%	1.05%	1.13%	0.00%	0.00%	0.00%
TSP - Dust	5,041.15	60.95	7.31	-	-	-
PM10 - Dust	1,433.52	17.33	2.08	-	-	-
PM2.5 - Dust	143.35	1.73	0.21	-	-	-
TSP - Exhaust	30.34	0.37	0.04	-	-	-
PM10 - Exhaust	30.34	0.37	0.04	-	-	-
PM2.5 - Exhaust	27.91	0.34	0.04	-	-	-
HC	52.61	0.64	0.08	-	-	-
NOx	972	11.75	1.41	-	-	-
CO	634	7.66	0.92	-	-	-
SOx	0.04	0.00	0.00	-	-	-
CO2	101.39	-	-	-	-	-

Project

	C			D		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	4,662.54	37.97	4.56	-	-	-
VMT (%)	2.66%	2.07%	2.20%	0.00%	0.00%	0.00%
TSP - Dust	13,873.84	112.99	13.56	-	-	-
PM10 - Dust	3,945.22	32.13	3.86	-	-	-
PM2.5 - Dust	394.52	3.21	0.39	-	-	-
TSP - Exhaust	104.37	0.85	0.10	-	-	-
PM10 - Exhaust	104.37	0.85	0.10	-	-	-
PM2.5 - Exhaust	96.02	0.78	0.09	-	-	-
HC	180.99	1.47	0.18	-	-	-
NOx	3,342.45	27.22	3.27	-	-	-
CO	2,180.45	17.76	2.13	-	-	-
SOx	0.14	0.00	0.00	-	-	-
CO2 (tons)	348.80	-	-	-	-	-

Increment

	C			D		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	3,307.21	21.59	2.59	-	-	-
TSP - Dust	8,832.70	52.05	6.25	-	-	-
PM10 - Dust	2,511.70	14.80	1.78	-	-	-
PM2.5 - Dust	251.17	1.48	0.18	-	-	-
TSP - Exhaust	74.03	0.48	0.06	-	-	-
PM10 - Exhaust	74.03	0.48	0.06	-	-	-
PM2.5 - Exhaust	68.11	0.44	0.05	-	-	-
HC	128.38	0.84	0.10	-	-	-
NOx	2,370.85	15.48	1.86	-	-	-
CO	1,546.63	10.10	1.21	-	-	-
SOx	0.10	0.00	0.00	-	-	-
CO2 (tons)	247.41	-	-	-	-	-

Baseline

	E			F		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	8,012.74	93.45	11.21	-	-	-
VMT (%)	6.00%	6.01%	6.42%	0.00%	0.00%	0.00%
TSP - Dust	29,803.34	347.60	41.71	-	-	-
PM10 - Dust	8,475.00	98.85	11.86	-	-	-
PM2.5 - Dust	847.50	9.88	1.19	-	-	-
TSP - Exhaust	179.37	2.09	0.25	-	-	-
PM10 - Exhaust	179.37	2.09	0.25	-	-	-
PM2.5 - Exhaust	165.02	1.92	0.23	-	-	-
HC	311.04	3.63	0.44	-	-	-
NOx	5,744	66.99	8.04	-	-	-
CO	3,747	43.70	5.24	-	-	-
SOx	0.24	0.00	0.00	-	-	-
CO2	599.43	-	-	-	-	-

Project

	E			F		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	30,498.31	248.39	29.81	-	-	-
VMT (%)	17.41%	13.54%	14.39%	0.00%	0.00%	0.00%
TSP - Dust	90,750.67	739.11	88.69	-	-	-
PM10 - Dust	25,806.22	210.18	25.22	-	-	-
PM2.5 - Dust	2,580.62	21.02	2.52	-	-	-
TSP - Exhaust	682.71	5.56	0.67	-	-	-
PM10 - Exhaust	682.71	5.56	0.67	-	-	-
PM2.5 - Exhaust	628.09	5.12	0.61	-	-	-
HC	1,183.88	9.64	1.16	-	-	-
NOx	21,863.41	178.06	21.37	-	-	-
CO	14,262.62	116.16	13.94	-	-	-
SOx	0.91	0.01	0.00	-	-	-
CO2 (tons)	2,281.57	-	-	-	-	-

Increment

	E			F		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	22,485.58	154.94	18.59	-	-	-
TSP - Dust	60,947.33	391.50	46.98	-	-	-
PM10 - Dust	17,331.22	111.33	13.36	-	-	-
PM2.5 - Dust	1,733.12	11.13	1.34	-	-	-
TSP - Exhaust	503.34	3.47	0.42	-	-	-
PM10 - Exhaust	503.34	3.47	0.42	-	-	-
PM2.5 - Exhaust	463.07	3.19	0.38	-	-	-
HC	872.84	6.01	0.72	-	-	-
NOx	16,119.30	111.07	13.33	-	-	-
CO	10,515.44	72.46	8.69	-	-	-
SOx	0.67	0.00	0.00	-	-	-
CO2 (tons)	1,682.14	-	-	-	-	-

Baseline

	G			H		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	72,587.16	815.66	97.88	33,745.62	416.59	41.66
VMT (%)	54.34%	52.46%	56.04%	25.26%	26.79%	23.85%
TSP - Dust	269,987.62	3,033.83	364.06	125,516.67	1,549.49	154.95
PM10 - Dust	76,774.75	862.71	103.53	35,692.42	440.62	44.06
PM2.5 - Dust	7,677.47	86.27	10.35	3,569.24	44.06	4.41
TSP - Exhaust	1,624.87	18.26	2.19	755.40	9.33	0.93
PM10 - Exhaust	1,624.87	18.26	2.19	755.40	9.33	0.93
PM2.5 - Exhaust	1,494.88	16.80	2.02	694.97	8.58	0.86
HC	2,817.67	31.66	3.80	1,309.93	16.17	1.62
NOx	52,036	584.72	70.17	24,191	298.64	29.86
CO	33,946	381.44	45.77	15,781	194.82	19.48
SOx	2.17	0.02	0.00	1.01	0.01	0.00
CO2	5,430.22	-	-	2,524.50	-	-

Project

	G			H		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	100,488.89	818.42	98.21	19,162.95	418.00	41.80
VMT (%)	57.38%	44.61%	47.42%	10.94%	22.78%	20.18%
TSP - Dust	299,014.36	2,435.28	292.23	57,021.20	1,243.79	124.38
PM10 - Dust	85,028.91	692.51	83.10	16,214.77	353.69	35.37
PM2.5 - Dust	8,502.89	69.25	8.31	1,621.48	35.37	3.54
TSP - Exhaust	2,249.45	18.32	2.20	327.21	7.14	0.71
PM10 - Exhaust	2,249.45	18.32	2.20	327.21	7.14	0.71
PM2.5 - Exhaust	2,069.50	16.85	2.02	301.03	6.57	0.66
HC	3,900.76	31.77	3.81	743.86	16.23	1.62
NOx	72,037.76	586.70	70.40	13,737.40	299.65	29.97
CO	46,993.91	382.74	45.93	8,961.61	195.48	19.55
SOx	3.00	0.02	0.00	0.57	0.01	0.00
CO2 (tons)	7,517.54	-	-	1,433.57	-	-

Increment

	G			H		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	27,901.72	2.76	0.33	-14,582.67	1.41	0.14
TSP - Dust	29,026.74	-598.55	-71.83	-68,495.47	-305.70	-30.57
PM10 - Dust	8,254.16	-170.21	-20.42	-19,477.64	-86.93	-8.69
PM2.5 - Dust	825.42	-17.02	-2.04	-1,947.76	-8.69	-0.87
TSP - Exhaust	624.58	0.06	0.01	-428.19	-2.19	-0.22
PM10 - Exhaust	624.58	0.06	0.01	-428.19	-2.19	-0.22
PM2.5 - Exhaust	574.62	0.06	0.01	-393.94	-2.01	-0.20
HC	1,083.08	0.11	0.01	-566.07	0.05	0.01
NOx	20,001.99	1.98	0.24	-10,453.92	1.01	0.10
CO	13,048.32	1.29	0.16	-6,819.63	0.66	0.07
SOx	0.83	0.00	0.00	-0.44	0.00	0.00
CO2 (tons)	2,087.32	-	-	-1,090.93	-	-

Baseline

	I			J		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,204.93	14.10	1.57	8,719.27	106.44	10.64
VMT (%)	0.90%	0.91%	0.90%	6.53%	6.85%	6.09%
TSP - Dust	4,481.74	52.45	5.83	32,431.27	395.90	39.59
PM10 - Dust	1,274.45	14.92	1.66	9,222.28	112.58	11.26
PM2.5 - Dust	127.44	1.49	0.17	922.23	11.26	1.13
TSP - Exhaust	26.97	0.32	0.04	195.18	2.38	0.24
PM10 - Exhaust	26.97	0.32	0.04	195.18	2.38	0.24
PM2.5 - Exhaust	24.81	0.29	0.03	179.57	2.19	0.22
HC	46.77	0.55	0.06	338.46	4.13	0.41
NOx	864	10.11	1.12	6,251	76.30	7.63
CO	563	6.59	0.73	4,078	49.78	4.98
SOx	0.04	0.00	0.00	0.26	0.00	0.00
CO2	90.14	-	-	652.29	-	-

Project

	I			J		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	1,253.54	14.15	1.57	6,436.44	140.40	14.04
VMT (%)	0.72%	0.77%	0.76%	3.68%	7.65%	6.78%
TSP - Dust	3,730.02	42.10	4.68	19,152.25	417.76	41.78
PM10 - Dust	1,060.68	11.97	1.33	5,446.21	118.80	11.88
PM2.5 - Dust	106.07	1.20	0.13	544.62	11.88	1.19
TSP - Exhaust	28.06	0.32	0.04	144.08	3.14	0.31
PM10 - Exhaust	28.06	0.32	0.04	144.08	3.14	0.31
PM2.5 - Exhaust	25.82	0.29	0.03	132.55	2.89	0.29
HC	48.66	0.55	0.06	249.85	5.45	0.54
NOx	898.63	10.14	1.13	4,614.11	100.65	10.06
CO	586.22	6.62	0.74	3,010.02	65.66	6.57
SOx	0.04	0.00	0.00	0.19	0.00	0.00
CO2 (tons)	93.78	-	-	481.51	-	-

Increment

	I			J		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	48.60	0.05	0.01	-2,282.82	33.96	3.40
TSP - Dust	-751.73	-10.35	-1.15	-13,279.01	21.87	2.19
PM10 - Dust	-213.76	-2.94	-0.33	-3,776.07	6.22	0.62
PM2.5 - Dust	-21.38	-0.29	-0.03	-377.61	0.62	0.06
TSP - Exhaust	1.09	0.00	0.00	-51.10	0.76	0.08
PM10 - Exhaust	1.09	0.00	0.00	-51.10	0.76	0.08
PM2.5 - Exhaust	1.00	0.00	0.00	-47.01	0.70	0.07
HC	1.89	0.00	0.00	-88.61	1.32	0.13
NOx	34.84	0.03	0.00	-1,636.49	24.34	2.43
CO	22.73	0.02	0.00	-1,067.57	15.88	1.59
SOx	0.00	0.00	0.00	-0.07	0.00	0.00
CO2 (tons)	3.64	-	-	-170.78	-	-

Baseline

	K			L		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	20,421.14	239.00	26.56	5,383.71	65.72	6.57
VMT (%)	0.00%	0.00%	0.00%	4.03%	4.23%	3.76%
TSP - Dust	751.91	8.80	0.98	20,024.68	244.45	24.44
PM10 - Dust	150.38	1.76	0.20	5,694.30	69.51	6.95
PM2.5 - Dust	36.91	0.43	0.05	569.43	6.95	0.70
TSP - Exhaust	31.80	0.37	0.04	120.51	1.47	0.15
PM10 - Exhaust	31.80	0.37	0.04	120.51	1.47	0.15
PM2.5 - Exhaust	29.25	0.34	0.04	110.87	1.35	0.14
HC	29.32	0.34	0.04	208.98	2.55	0.26
NOx	553.40	6.48	0.72	3,859	47.11	4.71
CO	132.81	1.55	0.17	2,518	30.73	3.07
SOx	0.72	0.01	0.00	0.16	0.00	0.00
CO2	-	-	-	402.75	-	-

Project

	K			L		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	21,244.85	239.81	26.65	3,974.18	86.69	8.67
VMT (%)	0.00%	0.00%	0.00%	2.27%	4.73%	4.19%
TSP - Dust	782.24	8.83	0.98	-	-	-
PM10 - Dust	156.45	1.77	0.20	3,362.76	73.35	7.34
PM2.5 - Dust	38.40	0.43	0.05	336.28	7.34	0.73
TSP - Exhaust	33.08	0.37	0.04	88.96	1.94	0.19
PM10 - Exhaust	33.08	0.37	0.04	88.96	1.94	0.19
PM2.5 - Exhaust	30.43	0.34	0.04	81.85	1.79	0.18
HC	30.50	0.34	0.04	154.27	3.37	0.34
NOx	575.72	6.50	0.72	2,848.98	62.14	6.21
CO	138.17	1.56	0.17	1,858.54	40.54	4.05
SOx	0.75	0.01	0.00	0.12	0.00	0.00
CO2 (tons)	-	-	-	297.31	-	-

Increment

	K			L		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	823.71	0.81	0.09	-1,409.53	20.97	2.10
TSP - Dust	30.33	0.03	0.00	-20,024.68	-244.45	-24.44
PM10 - Dust	6.07	0.01	0.00	-2,331.53	3.84	0.38
PM2.5 - Dust	1.49	0.00	0.00	-233.15	0.38	0.04
TSP - Exhaust	1.28	0.00	0.00	-31.55	0.47	0.05
PM10 - Exhaust	1.28	0.00	0.00	-31.55	0.47	0.05
PM2.5 - Exhaust	1.18	0.00	0.00	-29.03	0.43	0.04
HC	1.18	0.00	0.00	-54.71	0.81	0.08
NOx	22.32	0.02	0.00	-1,010.45	15.03	1.50
CO	5.36	0.01	0.00	-659.17	9.81	0.98
SOx	0.03	0.00	0.00	-0.04	0.00	0.00
CO2 (tons)	-	-	-	-105.45	-	-

Baseline

	M			Total On-site		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	-	-	-	133,589.61	1,554.73	174.67
VMT (%)	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
TSP - Dust	-	-	-	496,885.92	5,782.81	649.67
PM10 - Dust	-	-	-	141,296.45	1,644.42	184.74
PM2.5 - Dust	-	-	-	14,129.64	164.44	18.47
TSP - Exhaust	-	-	-	2,990.42	34.80	3.91
PM10 - Exhaust	-	-	-	2,990.42	34.80	3.91
PM2.5 - Exhaust	-	-	-	2,751.18	32.02	3.60
HC	-	-	-	5,185.65	60.35	6.78
NOx	-	-	-	95,766.76	1,114.54	125.21
CO	-	-	-	62,473.56	727.07	81.68
SOx	-	-	-	3.99	0.05	0.01
CO2	-	-	-	9,994		

Project 1.31

	M			Total On-site		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	-	-	-	175,135.46	1,834.53	207.12
VMT (%)	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%
TSP - Dust	-	-	-	509,306.85	5,200.88	590.50
PM10 - Dust	-	-	-	148,191.27	1,552.29	175.25
PM2.5 - Dust	-	-	-	14,819.13	155.23	17.53
TSP - Exhaust	-	-	-	3,818.66	38.85	4.41
PM10 - Exhaust	-	-	-	3,818.66	38.85	4.41
PM2.5 - Exhaust	-	-	-	3,513.17	35.74	4.06
HC	-	-	-	6,798.37	71.21	8.04
NOx	-	-	-	125,549.85	1,315.13	148.48
CO	-	-	-	76,303.04	761.11	86.54
SOx	-	-	-	5.23	0.05	0.01
CO2 (tons)	-	-	-	13,101.83	-	-

Increment

	M			Total On-site		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	-	-	-	41,545.85	279.80	32.45
TSP - Dust	-	-	-	12,420.94	-581.94	-59.17
PM10 - Dust	-	-	-	6,894.83	-92.13	-9.49
PM2.5 - Dust	-	-	-	689.48	-9.21	-0.95
TSP - Exhaust	-	-	-	828.25	4.04	0.50
PM10 - Exhaust	-	-	-	828.25	4.04	0.50
PM2.5 - Exhaust	-	-	-	761.99	3.72	0.46
HC	-	-	-	1,612.72	10.86	1.26
NOx	-	-	-	29,783.09	200.58	23.26
CO	-	-	-	13,829.48	34.03	4.85
SOx	-	-	-	1.24	0.01	0.00
CO2 (tons)	-	-	-	3,108.03	-	-

Baseline

	Total Offsite			Total		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	3,787,945.55	3,787,945.55	3,787,945.55	3,921,535.16	3,789,500.28	3,788,120.22
VMT (%)	100.00%	100.00%	100.00%			
TSP - Dust	139,473.29	139,473.29	139,473.29	636,359.21	145,256.10	140,122.96
PM10 - Dust	27,894.66	27,894.66	27,894.66	169,191.10	29,539.08	28,079.40
PM2.5 - Dust	6,846.87	6,846.87	6,846.87	20,976.52	7,011.31	6,865.35
TSP - Exhaust	5,898.06	5,898.06	5,898.06	8,888.47	5,932.86	5,901.97
PM10 - Exhaust	5,898.06	5,898.06	5,898.06	8,888.47	5,932.86	5,901.97
PM2.5 - Exhaust	5,426.21	5,426.21	5,426.21	8,177.40	5,458.23	5,429.81
HC	5,437.75	5,437.75	5,437.75	10,623.40	5,498.10	5,444.53
NOx	102,650.55	102,650.55	102,650.55	198,417.31	103,765.10	102,775.77
CO	24,635.25	24,635.25	24,635.25	87,108.81	25,362.33	24,716.94
SOx	133.92	133.92	133.92	137.90	133.96	133.92
CO2	7,067.22	7,067.22	7,067.22	17,061.02	7,067.22	7,067.22

Project

	Total Offsite			Total		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	3,940,736.00	-	-	4,115,871.46	1,834.53	207.12
VMT (%)	100.00%	100.00%	100.00%			
TSP - Dust	145,099.08	-	-	654,405.93	5,200.88	590.50
PM10 - Dust	29,019.82	-	-	177,211.09	1,552.29	175.25
PM2.5 - Dust	7,123.05	-	-	21,942.17	155.23	17.53
TSP - Exhaust	6,135.96	-	-	9,954.63	38.85	4.41
PM10 - Exhaust	6,135.96	-	-	9,954.63	38.85	4.41
PM2.5 - Exhaust	5,645.08	-	-	9,158.26	35.74	4.06
HC	5,657.09	-	-	12,455.46	71.21	8.04
NOx	106,791.06	-	-	232,340.91	1,315.13	148.48
CO	25,628.94	-	-	101,931.98	761.11	86.54
SOx	139.32	-	-	144.54	0.05	0.01
CO2 (tons)	7,339.35	-	-	20,441.18	-	-

Increment

	Total Offsite			Total		
	per Year	per Day	per Hour	per Year	per Day	per Hour
VMT (miles)	152,790.45	-3,787,945.55	-3,787,945.55	194,336.30	-3,787,665.75	-3,787,913.10
TSP - Dust	5,625.79	-139,473.29	-139,473.29	18,046.73	-140,055.23	-139,532.46
PM10 - Dust	1,125.16	-27,894.66	-27,894.66	8,019.99	-27,986.79	-27,904.15
PM2.5 - Dust	276.18	-6,846.87	-6,846.87	965.66	-6,856.08	-6,847.82
TSP - Exhaust	237.90	-5,898.06	-5,898.06	1,066.15	-5,894.01	-5,897.55
PM10 - Exhaust	237.90	-5,898.06	-5,898.06	1,066.15	-5,894.01	-5,897.55
PM2.5 - Exhaust	218.87	-5,426.21	-5,426.21	980.86	-5,422.49	-5,425.75
HC	219.34	-5,437.75	-5,437.75	1,832.06	-5,426.89	-5,436.49
NOx	4,140.51	-102,650.55	-102,650.55	33,923.60	-102,449.97	-102,627.29
CO	993.69	-24,635.25	-24,635.25	14,823.17	-24,601.22	-24,630.40
SOx	5.40	-133.92	-133.92	6.64	-133.91	-133.92
CO2 (tons)	272.13	-7,067.22	-7,067.22	3,380.17	-7,067.22	-7,067.22

	VOL1	VOL2	VOL3	VOL4	VOL5	VOL6	VOL7	VOL8	VOL9	VOL10
altMitTSPann	-3.50E-01	-8.14E-01	0.00E+00	-3.00E-01	-3.00E-01	1.14E-01	2.60E-01	4.97E-03	2.06E-01	7.84E-01
altMitTSPday	-1.28E+00	-2.97E+00	0.00E+00	-1.09E+00	-1.09E+00	4.15E-01	9.50E-01	1.81E-02	7.52E-01	2.86E+00
altMitPM10ann	-1.17E-01	-4.10E-01	0.00E+00	-1.48E-01	-1.48E-01	2.10E-02	1.31E-01	2.59E-03	3.90E-02	3.95E-01
altMitPM10day	-4.29E-01	-1.50E+00	0.00E+00	-5.40E-01	-5.40E-01	7.66E-02	4.77E-01	9.47E-03	1.42E-01	1.44E+00
altMitPM25ann	-4.03E-02	-1.27E-01	0.00E+00	-5.23E-02	-5.23E-02	5.06E-03	3.03E-02	1.03E-03	1.45E-02	9.38E-02
altMitPM25day	-1.47E-01	-4.62E-01	0.00E+00	-1.91E-01	-1.91E-01	1.85E-02	1.11E-01	3.76E-03	5.31E-02	3.42E-01
TSPann (lb/yr/src)	-24344.2	-56602.5	0	-20836.8	-20836.8	7899.8	18102.1	345.62535	14331.7	54510.2
TSPday (lb/day/src)	-243.442	-566.025	0	-208.368	-208.368	78.998	181.021	3.4562535	143.317	545.102
PM10ann (lb/yr/src	-8167.11	-28507.7	0	-10281.8	-10281.8	1459.44	9077.02	180.3284	2714.3	27434.8
PM10day (lb/day/s	-81.6711	-285.077	0	-102.818	-102.818	14.5944	90.7702	1.803284	27.143	274.348
PM25ann (lb/yr/src	-2803.9	-8798.71	0	-3636.89	-3636.89	351.818	2104.94	71.580398	1011.45	6518.57
PM25day (lb/day/s	-28.039	-87.9871	0	-36.3689	-36.3689	3.51818	21.0494	0.715804	10.1145	65.1857
TSPann (lb/yr)	-24,344	-56,602	0	-20,837	-20,837	7,900	18,102	346	14,332	54,510
TSPday (lb/day)	-243	-566	0	-208	-208	79	181	3	143	545
PM10ann (lb/yr)	-8,167	-28,508	0	-10,282	-10,282	1,459	9,077	180	2,714	27,435
PM10day (lb/day)	-82	-285	0	-103	-103	15	91	2	27	274
PM25ann (lb/yr)	-2,804	-8,799	0	-3,637	-3,637	352	2,105	72	1,011	6,519
PM25day (lb/day)	-28	-88	0	-36	-36	4	21	1	10	65
HC (lb/yr)	-640	-554	0	-16	-16	23	74	37	234	562
NOx (lb/yr)	-9,898	-8,146	0	-240	-240	174	1,097	539	5,164	8,263
CO (lb/yr)	-14,201	-5,306	0	-156	-156	112	516	351	5,533	5,382
SOx (lb/yr)	-0.305	-0.292	0	-0.009	-0.009	0.006	0.032	0.019	0.552	0.296
CO2 (ton/yr)	-584	-769	0	-23	-23	25	85	51	593	780
TSP (lb/yr)	-24,344	-56,602	0	-20,837	-20,837	7,900	18,102	346	14,332	54,510
PM10 (lb/yr)	-8,167	-28,508	0	-10,282	-10,282	1,459	9,077	180	2,714	27,435
PM2.5 (lb/yr)	-2,804	-8,799	0	-3,637	-3,637	352	2,105	72	1,011	6,519

	A	B	C	E0	G	H	I	J	K	L	M
altMitTSPann	1.12E-03	1.13E-02	9.15E-03	1.64E-02	1.30E-03	-4.86E-03	-2.70E-03	-5.33E-03	5.68E-06	-1.44E-02	0.00E+00
altMitTSPday	2.21E-03	2.99E-02	1.97E-02	3.84E-02	-9.61E-03	-7.92E-03	-1.36E-02	3.30E-03	2.04E-06	-6.40E-02	0.00E+00
altMitPM10ann	3.27E-04	3.27E-03	2.66E-03	4.75E-03	3.91E-04	-1.40E-03	-7.65E-04	-1.53E-03	1.32E-06	-1.70E-03	0.00E+00
altMitPM10day	6.48E-04	8.66E-03	5.73E-03	1.12E-02	-2.73E-03	-2.29E-03	-3.86E-03	1.02E-03	4.74E-07	1.13E-03	0.00E+00
altMitPM25ann	4.23E-05	4.00E-04	3.28E-04	5.85E-04	6.16E-05	-1.65E-04	-7.33E-05	-1.70E-04	4.80E-07	-1.89E-04	0.00E+00
altMitPM25day	8.80E-05	1.06E-03	7.22E-04	1.39E-03	-2.72E-04	-2.76E-04	-3.85E-04	1.93E-04	1.72E-07	2.14E-04	0.00E+00
TSPann (lb/yr/src)	77.83195	784.911	636.195	1137.98	90.676831	-337.861	-187.66	-370.281	0.39515	-1002.81	0
TSPday (lb/day/src)	0.420822	5.68721	3.75225	7.31431	-1.83023	-1.50926	-2.58687	0.62854	0.00039	-12.1988	0
PM10ann (lb/yr/src	22.71775	227.62	184.695	330.27	27.152115	-97.5776	-53.1691	-106.31	0.09185	-118.154	0
PM10day (lb/day/s	0.12352	1.65021	1.09171	2.12589	-0.520316	-0.43685	-0.73542	0.19384	9E-05	0.21544	0
PM25ann (lb/yr/src	2.94226	27.8257	22.8057	40.6703	4.2814437	-11.4789	-5.09388	-11.795	0.03336	-13.1091	0
PM25day (lb/day/s	0.016767	0.2028	0.13748	0.26525	-0.051877	-0.05248	-0.07332	0.0367	3.3E-05	0.04079	0
TSPann (lb/yr)	2,958	13,343	8,907	61,451	29,651	-68,924	-751	-13,330	32	-20,056	0
TSPday (lb/day)	16	97	53	395	-598	-308	-10	23	0	-244	0
PM10ann (lb/yr)	863	3,870	2,586	17,835	8,879	-19,906	-213	-3,827	7	-2,363	0
PM10day (lb/day)	5	28	15	115	-170	-89	-3	7	0	4	0
PM25ann (lb/yr)	112	473	319	2,196	1,400	-2,342	-20	-425	3	-262	0
PM25day (lb/day)	1	3	2	14	-17	-11	0	1	0	1	0
HC (lb/yr)	54	182	128	873	1,083	-566	2	-89	1	-55	0
NOx (lb/yr)	995	3,362	2,371	16,119	20,002	-10,454	35	-1,636	22	-1,010	0
CO (lb/yr)	649	2,193	1,547	10,515	13,048	-6,820	23	-1,068	5	-659	0
SOx (lb/yr)	0.041	0.140	0.099	0.671	0.833	-0.435	0.001	-0.068	0.029	-0.042	0
CO2 (ton/yr)	104	351	247	1,682	2,087	-1,091	4	-171	0	-105	0
TSP (lb/yr)	2,958	13,343	8,907	61,451	29,651	-68,924	-751	-13,330	32	-20,056	0
PM10 (lb/yr)	863	3,870	2,586	17,835	8,879	-19,906	-213	-3,827	7	-2,363	0
PM2.5 (lb/yr)	112	473	319	2,196	1,400	-2,342	-20	-425	3	-262	0

	Total Sentinel Butterfield			Total White Knob		
altMitTSPann						
altMitTSPday						
altMitPM10ann						
altMitPM10day						
altMitPM25ann						
altMitPM25day						
TSPann (lb/yr/src)						
TSPday (lb/day/src)						
PM10ann (lb/yr/src						
PM10day (lb/day/s						
PM25ann (lb/yr/src						
PM25day (lb/day/s						
TSPann (lb/yr)	203,599	835	141	-224,930	-1,448	-227
TSPday (lb/day)	835	-	-	-1,755	-	-
PM10ann (lb/yr)	73,438	387	65	-83,335	-561	-94
PM10day (lb/day)	387	-	-	-650	-	-
PM25ann (lb/yr)	14,207	100	17	-21,905	-187	-31
PM25day (lb/day)	100	-	-	-197	-	-
HC (lb/yr)	3,227	18	3	-1,937	-10	-2
NOx (lb/yr)	57,912	311	44	-31,624	-146	-27
CO (lb/yr)	39,735	202	30	-28,365	-173	-30
SOx (lb/yr)	3	0	0	-1	-	-
CO2 (ton/yr)	5,980	15	3	-2,765	-14	-2
TSP (lb/yr)	203,599	835	141	-224,930	-1,448	-227
PM10 (lb/yr)	73,438	387	65	-83,335	-561	-94
PM2.5 (lb/yr)	14,207	100	17	-21,905	-187	-31

	Total Processing Plant			Total Project w/o White Knob		
altMitTSPann						
altMitTSPday						
altMitPM10ann						
altMitPM10day						
altMitPM25ann						
altMitPM25day						
TSPann (lb/yr/src)						
TSPday (lb/day/src)						
PM10ann (lb/yr/src						
PM10day (lb/day/s						
PM25ann (lb/yr/src						
PM25day (lb/day/s						
TSPann (lb/yr)	7,149	69	12	210,749	903	153
TSPday (lb/day)	69	-	-	903	-	-
PM10ann (lb/yr)	1,247	12	2	74,685	398	67
PM10day (lb/day)	12	-	-	398	-	-
PM25ann (lb/yr)	331	3	1	14,538	104	17
PM25day (lb/day)	3	-	-	104	-	-
HC (lb/yr)	25	0	0	3,252	18	3
NOx (lb/yr)	209	2	0	58,121	313	45
CO (lb/yr)	134	1	0	39,869	203	30
SOx (lb/yr)	0	0	0	3	0	0
CO2 (ton/yr)	28	0	0	6,008	15	3
TSP (lb/yr)	7,149	69	12	210,749	903	153
PM10 (lb/yr)	1,247	12	2	74,685	398	67
PM2.5 (lb/yr)	331	3	1	14,538	104	17

	Total Project w/ White Knob		
altMitTSPann			
altMitTSPday			
altMitPM10ann			
altMitPM10day			
altMitPM25ann			
altMitPM25day			
TSPann (lb/yr/src)			
TSPday (lb/day/src)			
PM10ann (lb/yr/src			
PM10day (lb/day/s			
PM25ann (lb/yr/src			
PM25day (lb/day/s			
TSPann (lb/yr)	-14,182	-544	-74
TSPday (lb/day)	-852	-	-
PM10ann (lb/yr)	-8,650	-163	-27
PM10day (lb/day)	-252	-	-
PM25ann (lb/yr)	-7,367	-83	-14
PM25day (lb/day)	-94	-	-
HC (lb/yr)	1,316	8	1
NOx (lb/yr)	26,497	167	18
CO (lb/yr)	11,504	30	-1
SOx (lb/yr)	2	0	0
CO2 (ton/yr)	3,243	1	0
TSP (lb/yr)	-14,182	-544	-74
PM10 (lb/yr)	-8,650	-163	-27
PM2.5 (lb/yr)	-7,367	-83	-14

```
Volume Source Identifiers
  LOCATION VOL1     VOLUME    498771.228  3802380.117    0
** DESCRSRC White Knob Crushing
  LOCATION VOL2     VOLUME    498410.694  3802532.330    0
** DESCRSRC White Knob Pit
  LOCATION VOL3     VOLUME    499367.635  3802416.274    0
** DESCRSRC White Ridge Pit
  LOCATION VOL4     VOLUME    499169.967  3802653.553    0

** DESCRSRC OB1
  LOCATION VOL5     VOLUME    498786.819  3802108.559    0
** DESCRSRC OB2
  LOCATION VOL6     VOLUME    505294.247  3804607.151    0
** DESCRSRC Processing Plant
  LOCATION VOL7     VOLUME    504322.000  3798695.000    0
** DESCRSRC Butterfield Pit
  LOCATION VOL8     VOLUME    505430.000  3797960.000    0
** DESCRSRC B5 Pad Expansion
** DESCRSRC Butterfield-Sentinel Crushing
  LOCATION VOL10    VOLUME    505808.000  3798770.000    (
** DESCRSRC Sentinel Pit
```

Appendix M: Modeling Files on Electronic Media

Appendix N: Excerpt from Air Quality Study for Proposed South Quarry Project

8.0 CLASS I AREA ANALYSIS

As discussed in Section 2.0, this Project is not subject to either PSD or a conformity analysis. This section discusses the Class I area analysis, which is a CEQA/NEPA requirement.

For both the construction and operational phases, the emission increase associated with the mine expansion is less than 25 tpy of NO_x, less than 15 tpy of PM_{10}, and less than 2 tpy of $PM_{2.5}$, and the Project will be below the MDAQMD and CEQA significance thresholds. The SO_2 increase associated with the Project is less than 0.05 tpy and is considered negligible.

For all of the discussion in Section 8.0, we are using the project emissions increase of 0.1 tons/year for NO_x emissions and 15 tons/year for PM_{10} emissions (rounded up from 14.2 tons/year, for simplicity).

8.1 Federal Land Manager (FLM) Requirements for Class I Areas

Class I areas are designated in 40 CFR Part 81 and are defined as areas of special national or regional value from a natural, scenic, recreational, or historic perspective. Mandatory federal Class I areas include the following areas in existence on August 7, 1977:

- International parks;
- National wilderness areas that exceed 5,000 acres in size;
- National memorial parks that exceed 5,000 acres in size; and
- National parks that exceed 6,000 acres in size.

These areas are administered by the National Park Service (NPS), the USFS, or the United States Fish and Wildlife Service (USFWS). These FLMs are also responsible for evaluating a project's air quality impacts in the Class I areas and may make recommendations to the permitting agency to approve or deny permit applications. The FLMs are also responsible for preparing NEPA documents for sources located on federal lands. The FLM is typically consulted prior to the preparation of the NEPA document, which allows the FLM to assess the need for a Class I area impact analysis and provides the source the opportunity to provide their own analysis and data to support the NEPA process.

The FLM has authority under the CAA to require impact analyses if any source is thought to impact the air quality related values (AQRVs) in a Class I area. Class I area impact analyses were historically performed for proposed projects located within 100 kilometers (km) of a Class I area, although this has been extended to 300 km for some large projects.

The nearest Class I area to the Project is the San Gorgonio Wilderness located approximately 21 km to the south of the Project in the San Bernardino National Forest. Other Class I areas located within 100 km of the facility are presented in Figure 1-5. All are under USFS management, except for Joshua Tree National Park, which is located 48 km from the site and is under the management of the NPS. Therefore, the only Class I areas that are located within 50 km of the source are the San Gorgonio Wilderness and Joshua Tree National Park.

The Class I area analysis typically consists of:

- An analysis of impacts on other AQRVs, such as impacts to flora and fauna, water, and cultural resources (AQRV impact analysis), which includes:

 Copyright ©2016, Yorke Engineering, LLC

- A Visibility Impairment Analysis (VIA);
- An ozone impact analysis; and
- An Acid Deposition Analysis (ADA).

8.2 AQRV Impact Analysis

The FLM Air Quality Related Values Work Group (FLAG) has published two FLM guidance documents, both titled Phase I Report. The first was published in December 2000 and an updated document was published in November 2010. These documents provide procedures the FLM should use for determining AQRVs in Class I areas and the procedures the applicant should use to evaluate impacts on AQRVs. To the extent practical, procedures described in the 2010 FLAG Phase I Report have been employed to demonstrate the likelihood that the Project will not result in adverse impacts to the region's Class I areas.

Prior to the establishment of FLAG and its predecessor, the Interagency Workgroup on Air Quality Modeling (IWAQM), the various FLMs had little coordination on how to implement the requirements for Class I areas. The IWAQM and FLAG reports have allowed the FLMs to act on Class I area analyses using a consistent framework. The first Phase I Report was prepared in 2000. In 2008, FLAG released a draft update to the 2000 report. The update was prepared after FLAG recognized the need to update information in the 2000 report based on new scientific data. In addition, an initial screening test was added to determine if a source would need to perform further analysis. After publishing a federal register notice requesting comments on the revised document, a draft document was finalized and published in November 2010, which is referred to hereinafter as the 2010 FLAG Phase I Report.

The 2010 FLAG Phase I Report instructs the FLMs to review each application on a case-by-case basis and take into account the following factors:

- Current conditions of sensitive AQRVs within the Class I area;
- Magnitude of emissions from the project;
- Distance of the project from the Class I area;
- Potential for source growth in the region surrounding the Class I area;
- Existing/prevailing meteorological conditions in the region; and
- Cumulative effects to AQRVs of the project with other regional sources.

The 2010 FLAG Phase I Report identifies three major AQRVs the FLM should focus on, specifically visibility impacts, ozone impacts, and deposition of nitrogen and sulfur compounds. The AQRVs are set by the FLM and are specific to each Class I Area. Wilderness area (acid deposition impact) AQRVs can be found through the USFS Website at http://www.fs.fed.us/air/index.htm. Each major AQRV for the San Gorgonio Wilderness is presented in Appendix F. For the AQRV impact analysis, we are using the total Project emissions increase, including both mining fugitive source and mobile source Project emissions increases (as described in the previous sections).

Copyright ©2016, Yorke Engineering, LLC

8.2.1 Analysis for Class I Areas Located 50 km or More from the Site

For Class I areas located 50 km or more from the site, the 2010 FLAG Phase I Report provides a general screening method that was not available in the 2000 FLAG Phase I Report. If the total emissions of certain pollutants (tpy) divided by the distance to the Class I area in km is less than 10, no further analysis is necessary. The general screening method is applied to each area of concern: visibility impairment, ozone impacts, and acid deposition.

For MCC, the general screening method is quantified as follows:

$$(15 \text{ tpy of } PM_{10} + 0.1 \text{ tpy of } NO_x)/50 \text{ km} = 0.3 << 10$$

Based on this result, the FLMs will not be expected to require a more detailed analysis of visibility and haze impacts in Class I areas located beyond 50 km of the Project. This approach will also eliminate the requirements for ozone impacts and acid deposition impacts analysis for Class I areas beyond 50 km.

8.2.2 Analysis for Class I Areas Located Within 50 km of the Site

The following sections specifically address visibility, ozone, and acid deposition impacts for Class I areas located within 50 km of the site. The following sections present results for the San Gorgonio Wilderness, which is the closest Class I area to the site. Assuming that results for San Gorgonio Wilderness show that the specified screening criteria are not exceeded, an analysis for Joshua Tree National Park is not needed because it is further away.

For sources located within 50 km of a Class I area, the general screening method described above (for Class I areas located beyond 50 km of the Project) does not apply and the FLM is to be consulted as to the availability of any initial screening methods for each analysis. If no initial screening methods are available, the next level of screening analysis (referred to as Level 1 Screening) will likely be required by the FLMs.

8.2.2.1 Visual Impacts Analysis

For the Class I areas less than 50 km from MCC (San Gorgonio Wilderness and a small corner of Joshua Tree National Park), the plume visibility impacts are evaluated using a tiered approach.

For the VIA, the 2010 FLAG Phase I Report calls for VISCREEN modeling as the correct screening approach (page 20). Note that the VIA screening method discussed in this section is distinct from the general screening method discussed in Section 8.2.1. The VISCREEN model uses worst-case meteorology to estimate plume visibility. The two parameters output by VISCREEN are delta E, a plume perceptibility parameter based on color differences and brightness, and the plume contrast, a spectral criterion defined for a green wavelength of 0.55 microns.

VIA Summary

The VISCREEN model was run for the Project using PM_{10} and NO_x emission rates of 15 and 25 tons/yr, both of which were conservatively set at threshold levels for the purpose of the VIA screening analysis. The nearest Class I area is the San Gorgonio Wilderness, with the closest boundary located 21 km south of the Project. The most distant boundary in the San Gorgonio Wilderness is 42 km south of the Project.

A Level 2 VIA screening analysis was performed in accordance with the 2010 FLAG Phase I Report and USEPA guidance for VISCREEN (1992). Both meteorology and complex terrain were considered for the analysis, as follows:

- Wind direction: The boundaries of the San Gorgonio Wilderness lie within a southerly sector ranging from 153° to 204° of the Project. Since wind direction is measured at angles from which the wind is blowing, this sector corresponds to wind directions ranging from 333° to 24°. To further account for a plume angle of 11.25°, wind directions ranging from 322° to 35° were considered in the Level 2 VIA screening analysis.
- Stability class and wind speed: The VISCREEN guidance prescribes a procedure by which local hourly meteorological data is evaluated in order to identify the joint frequency of the occurrence of stability class, wind speed, and relevant wind directions. The meteorological data set used for AERMOD modeling was used in this analysis. Additionally, complex terrain was considered in selecting the stability class. A stability class of E and a wind speed of 2.0 meters per second (m/s) were selected based on this analysis, which is described below in greater detail.
- Background visual range: A background visual range of 257 km was obtained from the USFS website regarding AQRVs, and is identified as the average annual natural visibility in the wilderness area (USFS 2016).
- Other parameters: Neither the 2010 FLAG Phase I Report nor the MDAQMD have provided modeling guidelines or recommended parameters for the other VISCREEN inputs. Nearby air quality management districts do provide modeling guidelines and it is common to use other jurisdiction's guidelines if appropriate for the situation. For this analysis, we used the guidance in SCAQMD Rule 1303, Appendix B, Modeling Analysis for Visibility, which recommends that primary NO_2, soot, and sulfate (SO_4) emissions be set to 0 tpy, which is also the model default. The USEPA defaults for particle characteristics and background ozone were also used.

The threshold visibility values to which VISCREEN results should be compared are stated in the 2010 FLAG Phase I Report (page 21), and are the same as those listed in the USEPA guidance for VISCREEN, dated June 1992. These threshold values are 2.0 for the total color contrast (delta E) and 0.05 for contrast. The VISCREEN model output file is provided in Appendix G.

The VISCREEN modeling results are presented in Table 8-1 and show that the results inside the Class I area ("Plume") are below the threshold values ("Standard") for both delta E and contrast. A negative value for plume contrast is a valid result and indicates that the plume appears darker than the sky. The conservative nature of the VISCREEN model will ensure the proposed changes at MCC will not negatively impact visibility at nearby Class I areas.

Copyright ©2016, Yorke Engineering, LLC

Table 8-1: Maximum Visual Impacts Inside the Class I Area

					Delta E		Contrast	
Background	**Theta**	**Azimuth**	**Distance**	**Alpha**	**Standard**	**Plume**	**Standard**	**Plume**
SKY	10	158	42	10	2	0.428	0.05	0.009
SKY	140	158	42	10	2	0.091	0.05	-0.003
TERRAIN	10	158	42	10	2	1.206	0.05	0.009
TERRAIN	140	158	42	10	2	0.085	0.05	0.001

Stability Class and Wind Speed Analysis for Use as Inputs to the VIA for Level 2 VISCREEN Modeling

The Level 2 VIA screening analysis consists of identifying the joint frequency distribution of wind direction, wind speed, and atmospheric stability as measured at or near the location of the emission source. As described previously, a sequential hourly 5-year meteorological data set was prepared for the purpose of performing an ambient air quality analysis of Project emissions using the AERMOD dispersion model. This 5-year data set was used for identifying the stability class and wind speed to be used in the VISCREEN analysis.

The first step in the analysis is to stratify the data set into four equal length time periods of the day, specifically with a duration of 6 hours each. The second step is to rank dispersion conditions by the calculated product of $\sigma_y \times \sigma_z \times u$, where u is the measured wind speed and σ_y and σ_z are the Pasquill-Gifford horizontal and vertical diffusion coefficients for the calculated stability class and downwind distance along the stable plume trajectory. Table 8-2 summarizes the results of these first two steps of the analysis.

Copyright ©2016, Yorke Engineering, LLC

Table 8-2: Worst-Case Meteorological Conditions for Plume Visual Impact Calculations

Dispersion Condition		Transport Time (Hours)	Frequency (f) and Cumulative Frequency (cf) of the Occurrence of Hourly Dispersion Conditions Associated with Class I Area Transport Wind Direction by Time of Day (Percent)							
Stability Class, Wind Speed (m/s)	$\sigma_y \times \sigma_z \times u$ (m^3/s)		Hours 1-6		Hours 7-12		Hours 13-18		Hours 19-24	
			f	cf	f	cf	f	cf	f	cf
F, 1	3.13E+04	5.7	0.34	0.34	0.06	0.06	0.22	0.22	0.52	0.52
F, 2	6.26E+04	2.9	0.31	0.65	0.04	0.10	0.12	0.34	0.66	1.18
F, 3	9.39E+04	1.9	0.02	0.67	0.02	0.12	0.05	0.38	–	–
E, 1	8.53E+04	5.7	0.00	0.67	0.00	0.12	0.00	0.38	–	–
E, 2	1.71E+05	2.9	0.04	0.70	0.03	0.15	0.04	0.42	–	–
D, 1	2.09E+05	5.7	0.00	0.70	0.03	0.17	0.03	0.45	–	–
E, 3	2.56E+05	1.9	0.16	0.87	0.05	0.22	0.15	0.59	–	–
E, 4	3.41E+05	1.4	0.04	0.90	0.00	0.22	0.04	0.63	–	–
E, 5	4.27E+05	1.1	0.00	0.90	0.00	0.22	0.00	0.63	–	–
D, 2	4.19E+05	2.9	0.00	0.90	0.02	0.24	0.09	0.72	–	–
D, 3	6.28E+05	1.9	0.03	0.93	0.04	0.27	0.19	0.91	–	–
D, 4	8.38E+05	1.4	0.06	0.99	0.05	0.32	0.27	1.19	–	–
D, 5	1.05E+06	1.1	0.06	1.06	0.12	0.44	–	–	–	–
D, 6	1.26E+06	1.0	–	–	0.17	0.61	–	–	–	–
D, 7	1.47E+06	0.8	–	–	0.16	0.78	–	–	–	–
C, 1	1.51E+06	5.7	–	–	0.01	0.79	–	–	–	–
D, 8	1.68E+06	0.7	–	–	0.05	0.84	–	–	–	–
D, 9	1.88E+06	0.6	–	–	0.06	0.90	–	–	–	–
D, 10	2.09E+06	0.6	–	–	0.05	0.96	–	–	–	–
D, 11	2.30E+06	0.5	–	–	0.02	0.98	–	–	–	–
D, 12	2.51E+06	0.5	–	–	0.01	0.99	–	–	–	–
C, 2	3.02E+06	2.9	–	–	0.04	1.02	–	–		

Copyright ©2016, Yorke Engineering, LLC

The next step is to select the worst-case 1st percentile meteorological condition as being indicative of worst-day plume visual impacts. In this case, the combination of F stability class and a wind speed of 2 m/s is selected based on the results for the meteorological hours from 19:00 to 24:00. While this time period is generally associated with nighttime hours, the USEPA VISCREEN guidance explicitly states that nighttime dispersion conditions must be considered because maximum plume visual impacts are often observed in the morning after a period of nighttime transport. However, the selection of meteorological conditions from this time period is conservative because the Project will not be operating beyond sunset. Nevertheless, for the purposes of the Level 2 VIA screening analysis of the Project, the combination of F stability class and a wind speed of 2 m/s was selected for further analysis.

The last step in the process is to evaluate complex terrain. The Project, at about 6,000 feet in elevation, is separated from the San Gorgonio Wilderness by a high ridge that exceeds 8,000 feet in elevation, the Big Bear Lake valley, and Sugarloaf Mountain (9,950 feet). The San Gorgonio Wilderness has terrain with elevations greater than 10,000 feet. The USEPA's VISCREEN guidance states that the selected stability class should be shifted to one category less stable if an observer in the Class I area is at least 500 meters above the emissions release height or if elevated terrain separates an observer in the Class I area from the emission source. In the case of an observer in the San Gorgonio Wilderness, both criteria are satisfied. Therefore, the combination of E stability class and a wind speed of 2 m/s was selected for input to VISCREEN.

8.2.2.2 Ozone Impact Analysis

The 2010 FLAG Phase I Report has identified ozone as an ambient air quality pollutant of concern. AQRVs have been established in Class I areas to determine if the ozone impacts are damaging to the flora of the area. The AQRV values for the San Gorgonio Wilderness are listed in Appendix F, which shows that the lowest AQRV for ozone is 45 parts per billion (ppb).

There are no recommended or approved models available for calculating ozone impacts from an individual project. As noted in the 2010 FLAG Phase I Report, ozone impacts are directly related to NO_x concentrations. Therefore, we used calculated NO_x concentration increases and then applied a reference that relates NO_x concentration increases to ozone concentration increases. This approach is used because, in this instance, there is no standard approach provided by the 2010 FLAG Phase I Report. The NO_x concentration used is based on AERMOD modeling for annual average concentrations at the Class I area, as discussed above. The threshold values applied for comparing with the model results are the ozone AQRVs published for the San Gorgonio Wilderness.

The USEPA-approved AERMOD dispersion model was used to estimate the annual NO_x concentration of the emissions from the Project at the northern edge of the San Gorgonio Wilderness boundary. The model was run with 5 years of meteorological data per USEPA modeling guidance in 40 CFR 51 Appendix W, which the 2010 FLAG Phase I Report references. Only the haul road emissions source was considered in this analysis, as that is the source that comprises the haul trucks and water trucks being evaluated. These trucks were assumed by AERMOD to operate for 10 hours each weekday from 7:00 am to 5:00 pm. Since the trucks operate on a schedule of 2,500 hours per year (10 hours each weekday,

Copyright ©2016, Yorke Engineering, LLC

50 weeks per year), the modeled NO_2 emission rate is calculated by dividing 0.1 tpy by 2,500 operating hours. The resulting modeled emission rate is 0.13 lb/hr [0.017 grams per second (g/s)]. The model output file and input parameters for the worst-case year are provided in Appendices C and D.

AERMOD predicted a 5-year maximum annual X/Q of 0.00148 microgram per cubic meter ($\mu g/m^3$)/(g/s), as shown in Appendices C and D. Multiplying this value by the modeled emission rate of 0.017 g/s results in a maximum predicted annual NO_2 concentration of 0. $\mu g/m^3$. The USEPA national default ratio of NO_2 to NO_x is 0.75 per 40 CFR 51 Appendix W. However, we have conservatively assumed that all NO_x is NO_2. Assuming all the NO_x as NO_2, this will translate to 0.00000195 parts per billion (ppb) of NO_2.

Using the ozone isopleths in the Seinfeld 1986 reference (see Appendix H), the worst-case ratio of the ozone increase to the NO_2 increase is less than 10. Therefore, as shown in Table 8-3, based on a NO_x concentration of 0.000013 ppb, the maximum ozone increase is 0.00013 ppb. This is much less than the lowest AQRV for ozone in Appendix F, which is 45 ppb.

Table 8-3: Evaluation of Ozone Impacts Using Relationship between NO_x Concentration Increases and Ozone Concentration Increases

Item	Units	Value	Reference
Maximum annual NO_x concentration at northern edge of the San Gorgonio Wilderness boundary	$\mu g/m^3$	0.000025	AERMOD modeling
Maximum NO_2 concentration in ppb	ppb	0.000013	Conversion of $\mu g/m^3$ to ppb
Ratio of ozone increase to NO_2 concentration increase	Ratio	<10	Seinfeld 1986
Maximum ozone increase	ppb	0.00013	Calculated from above ratio
AQRV for ozone impacts	ppb	45	Appendix F
Is increase above AQRV?	Yes/No	No	–

For comparison, please note that the NO_x emissions from this Project were less than 0.1% of the total NO_x emissions in the MDAQMD territory in 2007.

8.2.2.3 Acid Deposition Analysis

Emissions of NO_x and SO_x may be converted into nitrates, sulfates, and sulfites in the atmosphere. These compounds, in turn, may then be deposited into water bodies and vegetative surfaces where the acidic nature of the compounds may damage the flora or fauna.

The FLM may request a nitrogen and sulfur deposition analysis. As mentioned, it is in the FLM's authority to request deposition impacts for sources if they suspect a detrimental impact on Class I areas. AQRVs for nitrogen and sulfur deposition have been established through the FLAG Phase I process. The AQRV values for the San Gorgonio Wilderness are listed in Appendix F, which shows that the lowest AQRV for acid deposition is 3.0 kilogram per hectare per year (kg/ha/year).

Copyright ©2016, Yorke Engineering, LLC

The following ADA screening method can be used to perform an ADA for Class I areas less than 50 km from the site. An USFS ADA screening methodology for calculating acid neutralizing capacity (ANC) change to high elevation lakes includes a calculation to determine the deposition rates of nitrogen and sulfur from ambient NO_x and SO_x concentrations. Dispersion modeling without the complex nitrogen and sulfur chemical mechanisms can then be used to determine the concentrations of NO_x and SO_x at the location of interest. If the ADA screening method estimates deposition rates above the AQRV values, more refined modeling may be required by the FLM.

The ADA screening methodology provided by the USFS was used to estimate the nitrogen deposition rates. This methodology was applied based on predicted NO_2 concentrations at the boundary of the San Gorgonio Wilderness. SO_x emissions from the Project are insignificant and will not impact the acid deposition rates.

The 2010 FLAG Phase I Report specifies the MAGIC-WAND deposition model and also mentions the USFS Rocky Mountain Region's recommendation to use either CALPUFF or AERMOD modeling for nitrogen deposition (page 65). The 2010 FLAG Phase I Report also indicates that the Rocky Mountain Region recommends the USFS publication, "Screening Methodology for Calculating ANC Change to High Elevation Lakes," for ADA screening (page 65). The parameter values used are those found in the nitrogen deposition rate equation in the USFS publication (which calculates nitrogen deposition rate from NO_x concentration and other parameters). The NO_x concentration used is based on AERMOD modeling for annual average concentrations at the Class I area. The threshold values applied for comparing with the model results are the acid deposition AQRVs published for the San Gorgonio Wilderness.

The NO_2 deposition can be estimated from the NO_2 concentration according to the equation found in the USFS publication, "Screening Methodology for Calculating ANC Change to High Elevation Lakes":

$$Dn = \frac{\text{pollutant}}{\text{concentration}}\left(\mu g / m^3\right) * \frac{\text{deposition}}{\text{velocity}}\left(0.05\ m/s \text{ for } HNO_3\right) * \frac{\text{molecular weight}}{\text{ratio } NO_2 \text{ to } N}\left(\frac{14}{46}\right) * \frac{\text{total deposition to}}{\text{dry deposition ratio}}(2.0) * \left(\frac{315.4\,kg/ha/yr}{m/s \times \mu g/m^3}\right)$$

The annual NO_x concentration at the Northern edge of the San Gorgonio Wilderness boundary was estimated, as described above, under ozone impact analysis. The estimated deposition according to the above equation is 0.00014 kg/ha/year. As shown in Table 8-4, the estimated deposition is considerably less than the lowest listed AQRV threshold for the San Gorgonio Wilderness, as detailed in Appendix F.

Copyright ©2016, Yorke Engineering, LLC

Table 8-4: Evaluation of Acid Deposition Based on USFS ADA Screening Methodology

Item	Units	Value	Reference
Maximum annual NO_x concentration at northern edge of the San Gorgonio Wilderness boundary	$\mu g/m^3$	0.000015	AERMOD modeling
Deposition rate	kg/ha/year	0.00014	Calculated from above equation from USFS publication
AQRV for acid deposition	kg/ha/year	0.005	Appendix F
Is increase above AQRV?	Yes/No	No	–

Copyright ©2016, Yorke Engineering, LLC

9.0 CONCLUSIONS ABOUT SIGNIFICANCE FINDINGS AND CLASS I AREA ANALYSIS

Table 9-1 presents a summary of the Project construction and operational emission and health risk impacts and the comparison of this information to the significance thresholds for criteria pollutants and health risk.

The emission and health risk calculations for the construction and operational phases demonstrate that the construction and operational worst-case emissions and health risks from the Project, including Project design features and proposed mitigation measures, are below the criteria pollutant emissions and health risk significance thresholds.

The GHG emission calculations for the construction and operational phases demonstrated that the sum of the amortized construction GHG emissions and the operational GHG emissions from the Project are below the relevant significance threshold. As such, no mitigation is required. However, the truck fleet changes identified as mitigation for the PM_{10} and $PM_{2.5}$ emissions will also reduce GHG emissions.

In conclusion, as presented in previous sections (5.0, 6.0, and 7.0), we have reached the conclusion that the Project air quality and GHG emissions for each of the construction and operational phases are less than significant with mitigation.

For Class I areas that are more than 50 km away from MCC, impact analyses are not required by the FLM because the initial screening method in the 2010 FLAG Phase I Report shows that the change in emission levels is below the level required to trigger analysis requirements.

For Class I areas within 50 km of the site, the screening air quality analysis performed for this study shows that the Project is not expected to impair visibility, cause adverse ozone impacts, or result in acid deposition impacts.

Copyright ©2016, Yorke Engineering, LLC